



## **RemotEye Lite, version 3**

*User Manual*



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## 1 Abbreviations

Abbreviation	Description
DICOM	Digital Imaging and COmmunications in Medicine
DLL	Dynamic Link Library
GUI	Graphical User Interface
HTML	Hyper Text Markup Language
HTTP	Hyper Text Transfer Protocol
JRE	Java Runtime Environment
JWS	Java Web Start
LAN	Local Area Network
PACS	Picture Archiving and Communication System
PC	Personal Computer
RAM	Random Access Memory
TCP	Transfer Control Protocol
URL	Uniform Resource Locator
WADO	Web Access to DICOM persistent Objects

## 2 Indications for use

The RemotEye Lite software module is intended to be used as a lightweight, web-based, zero-footprint medical image viewer to download, visualize, review, analyse, interpret and manipulate medical multi-modality image data stored in DICOM format, also stored in remote locations with respect to the viewing site. When interpreted by a trained physician, the medical images displayed by RemotEye Lite can be used as an element for diagnosis.

When employed for diagnostic purposes, RemotEye Lite should be used in conjunction with a diagnostic-quality PC monitor, which guarantees compliance with DICOM 3.0 – Part 14 (Grayscale Standard Display Function).

Typical users of RemotEye Lite are trained healthcare professionals, including but not limited to radiologists, physicians, nurses and technicians.

## 3 Manual in printed paper form

According to European Regulation EU No 207/2012, upon request, you are entitled to receive a printed paper version of this manual for free. Physical delivery of this printed paper version shall happen within 7 days from the date of the request. Request shall be done via email, by writing to the email address [support@neologica.it](mailto:support@neologica.it).

## 4 Before you begin

Before beginning usage of the RemotEye Lite software module, please ensure that your software module has been installed correctly, and is working properly. This can be done by verifying that the "Installation Checklist" described in the Installation Manual has been executed and all tests have been passed.

### 4.1 *Minimum hardware requirements*

RemotEye Lite shall run on a machine based on the x86 or on the x64 (also known as x86-64, x86\_64 or AMD64) CPU architectures. Here is the minimum configuration which is required in order to ensure RemotEye Lite will work properly on the client side:

- CPU Intel Core i5, 2.5 GHz or faster
- 8 GB RAM or more
- Dedicated graphics adapter, 1 GB video memory or more, video driver compatible with OpenGL 2
- Screen with 1280x768 minimum resolution
- Hard Disk 7200 RPM or faster

- 50 GB minimum free hard disk space

## 4.2 Supported operating systems

RemotEye Lite works on the following Operating Systems:

- Microsoft Windows operating systems of the following version:
  - Windows Server 2012 R2, 64-bit versions
  - Windows Server 2016, 64-bit versions
  - Windows 8, 32-bit and 64-bit
  - Windows 10, 32-bit and 64-bit versions
- Apple Mac OS X of the following versions:
  - Mac OS X 10.8.3, or higher
- Linux operating systems of the following versions:
  - Oracle Linux 5.5+, 6.x (32-bit), 6.x (64-bit), 7.x (64-bit)
  - Red Hat Enterprise Linux 5.5+, 6.x (32-bit), 6.x (64-bit), 7.x (64 bit)
  - Ubuntu Linux 13 and above
  - Suse Linux Enterprise Server 10 SP2 and above

## 4.3 Supported web browsers

RemotEye Lite web interface can be opened in the following web browsers:

- Microsoft Internet Explorer, version 9 and above
- Microsoft Edge, any version
- Google Chrome, version 4 and above
- Mozilla Firefox, version 4 and above
- Apple Safari, version 4 and above

NeoLogica in any case recommends using the latest version of the web browser of your choice.

## 5 Introduction

This document will list all the functionalities offered by RemotEye Lite and its web interface. RemotEye Lite is a software system designed so that user have access to DICOM images stored on a RemotEye Viewer enabled backend using mobile devices or, more generally, any web-capable device. RemotEye Lite is made of two distinct parts:

1. The RemotEye Lite server, which handles the communication between backend and clients.
2. The RemotEye Lite web interface, which communicates with the server in order to display DICOM images on the client.

As stated before, RemotEye Lite allows user to have access to DICOM images using a RemotEye Viewer-enabled backend. This means that a pre-existing integration between the backend and RemotEye Viewer is needed so that RemotEye Lite works properly.

Once the installation will be completed, two main entry points will be available, in order to configure and use RemotEye Lite:

<http://<yourserver>:<yourport>/config/>

for the RemotEye Lite server configuration,

<http://<yourserver>:<yourport>/viewer/>

used from clients in order to search and display DICOM images.

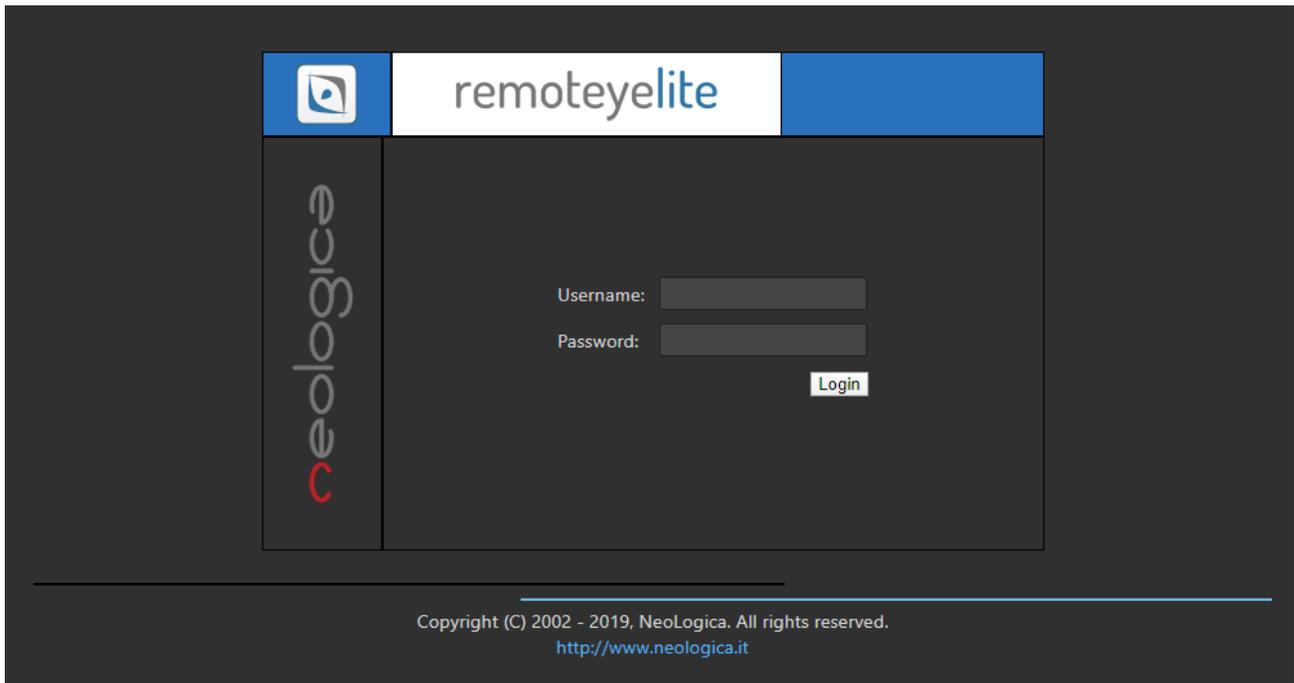
The following sections will list all the configurations and functionalities available using the above URL.

## 6 RemotEye Lite server

RemotEye Lite server is the part of RemotEye Lite entitled to handle communications between the backend and the RemotEye Lite clients. The server acts as a normal web server and can be configured by accessing the url:

<http://<yourserver>:<yourport>/config/>

Upon entering this interface, the following page will be displayed:



This is the login page. Username and password will be asked in order to grant access to the interface and all other configuration pages.

This configuration interface allows access to only one user which, by default, has the following username and password:

**Username:** *admin*

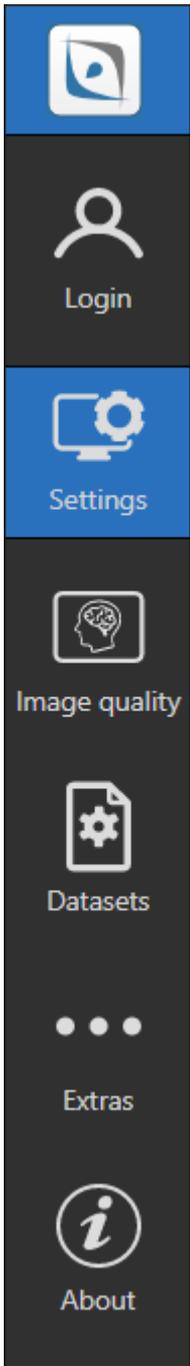
**Password:** *admin*

**Important note:** due to security reasons, it is very important, after the first access, to change the password for this preconfigured user.

Once authenticated, user will be automatically redirected to the RemotEye Lite server main configuration page.

The configuration interface is divided into 3 subgroups which are accessible using the left toolbar that is laid on the configuration page, as shown below with a brief description of every single section is provided.

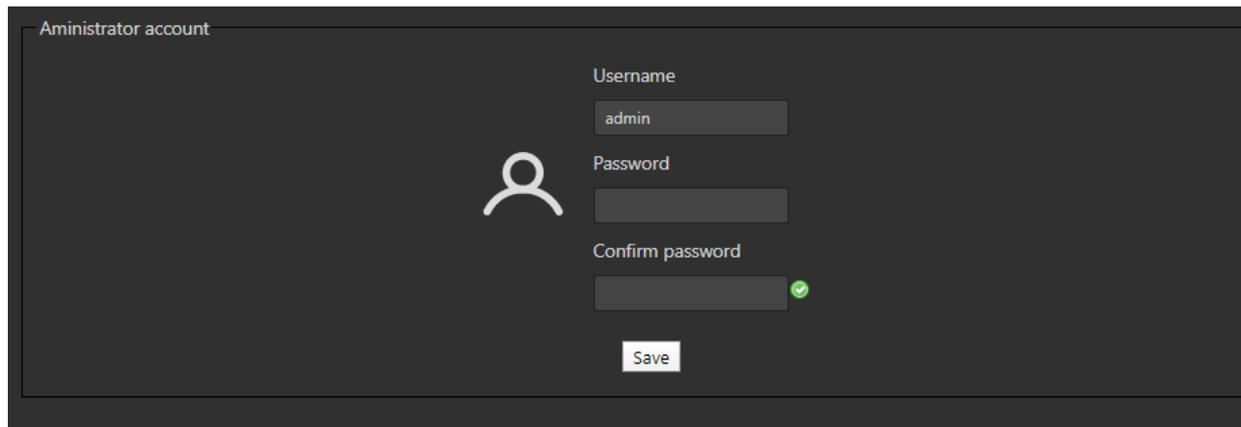
- **Login** section: this section allows users to change administrator username and password.
- **Settings** section: this section allows users to configure the various integration URLs needed by RemotEye Lite server to communicate with the backend.
- **Image quality** section: this section allows to configure and specify how images will be delivered to the clients, in term of quality and resolution.
- **Datasets** section: this section allows to configure which DICOM data elements will be delivered to the clients as part of the information returned to them.



- **Extras** section: this section allows to configure extra configuration detail such as logs production and default date formats.
- **About** section: this section allows to access the information page of the RemotEye Lite module

### 6.1 Login

The **Login** section can be reached by clicking the  icon on the left toolbar. Upon clicking this icon, the following page will be shown:



A description of fields laid on this page follows:

- **Username:** the username of the administrator user.

- **Password:** the password that will be used by the administrator user in order to enter the configuration interface.
- **Confirm password:** this field is used to check the validity of the password.

By clicking the **Save** button, the new information will be stored and, in case of changes, the current administrator user will be logged out.

## 6.2 Settings

The **Settings** section can be reached by clicking the  icon on the left toolbar.

By clicking this icon, a page containing the entire configuration will be loaded as shown below:

- Login
- Settings
- Image quality
- Datasets
- Extras
- About

### RemotEye Lite server Configurations

**RemotEye Server's document root:**  
  
A path, on the server machine, from where documents are read in order to be served over HTTP.

**RemotEye Server's listening IP address:**  
  
An IP address upon which the HTTP server will be waiting connections.

**RemotEye Lite server's storage path:**  
  
A path, on the server machine, where RemotEye Lite server will temporarily store DICOM images.

**Maximum files' age:**  
  
The maximum age (in days) of files in the temporary storage; files older than the set age will be purged.

**Query Studies URL:**  
  
The URL, RemotEye Lite server will call in order to find studies.

**Query Series URL:**  
  
The URL, RemotEye Lite server will call in order to find series.

**Query Instances URL:**  
  
The URL, RemotEye Lite server will call in order to find instances.

**Retrieve Instance URL:**  
  
The URL, RemotEye Lite server will call in order to download DICOM images.

**Update Study Info URL:**  
  
The URL, RemotEye Lite server will call in order to update studies information.

**Users' settings**

RemotEye's backend integration supports the RetrieveUserSettingsURL  
**Retrieve User Settings URL:**  
  
Enable this option if the backend integration supports retrieval of users' settings through URL.

RemotEye's backend integrations does not support the RetrieveUserSettingsURL  
Enable this option if the backend integration does not support retrieval of users' settings through URL.

RemotEye's backend integration supports the StoreUserSettingsURL  
**Store User Settings URL:**  
  
Enable this option if the backend integration supports storage of users' settings through URL.

RemotEye's backend integrations does not support the StoreUserSettingsURL  
Enable this option if the backend integration does not support storage of users' settings through URL.

**Initial Tree**

RemotEye's backend integration supports the InitialTreeURL  
**Initial Tree URL:**  
  
Enable this option if the backend integration supports the InitialTreeURL and it supports the following parameters:

1. filename
2. modality
3. submodality

RemotEye's backend integration does not support the InitialTreeURL  
Enable this option if the backend integration does not support the InitialTreeURL. In this case QueryStudiesURL, QuerySeriesURL, and QueryInstancesURL will be used.

**Authentication**

RemotEye's backend integration supports the AuthenticationURL  
**Authentication URL:**  
  
Enable this option if the backend integration supports authentication through URL.

RemotEye's backend integrations does not support the AuthenticationURL  
Enable this option if the backend integration does not support authentication through URL.

Allow users to change their own password directly from RemotEye Lite  
By enabling this option, users will be able to update their own password directly through RemotEye Lite. The Authenticate URL must support this mechanism.

**Remote AE titles**

RemotEye's backend integration supports the QueryAETitlesURL  
**Query AE Titles URL:**  
  
Enable this option if the backend integration supports multiple AE Titles via the Query AE Titles URL.

RemotEye's backend integration DOES NOT support the QueryAETitlesURL  
Enable this option if the backend integration does not support multiple AE Titles.

**Notify Client Will Load Instances**

RemotEye's backend integration supports the NotifyClientWillLoadInstancesURL  
**Notify Client Will Load Instances URL:**  
  
Enable this option if the backend integration supports the Notify Client Will Load Instances URL.

RemotEye's backend integration DOES NOT support the NotifyClientWillLoadInstancesURL  
Enable this option if the backend integration DOES NOT support the Notify Client Will Load Instances URL.

**Periodic url calls**

Setup one or more URLs that RemotEye Lite will call periodically

URL	Frequency
http://127.0.0.1/PW/REV/keepSessionAlive?rel=true&AuthenticationToken=_AUTH_TOKEN_&BCISessID=_CLISESSID_	15000 millis
<input type="button" value="-"/> <input type="button" value="+"/>	

**License Manager**

Use the following URL to redirect License Manager requests  
**License Manager URL:**  
  
Enable this option if the backend integration supports license manager forwarding through URL.

Use the license manager installed on the following server:  
**License manager hostname:**  
  
**License manager port:**

A description of all the fields laid on this page follows:

- **RemotEye Server's document root:** a path, on the server machine, from where documents are read in order to be served over HTTP.
- **RemotEye Server's listening IP address:** an IP address and port upon which the HTTP server will be waiting for connections.
- **RemotEyeServer's storage path:** a path, on the server machine, where RemotEye Lite server will temporarily store DICOM Images.
- **Maximum files' age:** the maximum age (in days) of files in the temporary storage; files older than the set age will be purged.
- **Query Studies URL:** the URL RemotEye Lite server will call in order to find studies on the remote backend.
- **Query Series URL:** the URL RemotEye Lite server will call in order to find series on the remote backend.
- **Query Instances URL:** the URL RemotEye Lite server will call in order to find instances on the remote backend.
- **Retrieve Instance URL:** the URL RemotEye Lite server will call in order to download DICOM images from the remote backend.
- **Update Study Info URL:** the URL RemotEye Lite server will call in order to update information about a study, for instance in order to request a 'fresh copy' of a study.
- **Retrieve User Settings URL:** the URL RemotEye Lite server will call in order to retrieve the settings from the server for a specific user.
- **Store User Settings URL:** the URL RemotEye Lite server will call in order to store settings for a specific user.
- **Initial Tree URL configuration:** enable the **Initial Tree URL** configuration if the backend integration supports the InitialTreeURL and it supports the following parameters:
  - patientIDsList
  - studyInstanceUIDsList
  - accNumsList

If the backend integration does not support the **InitialTreeURL**, **QueryStudiesURL**, **QuerySeriesURL** and **QueryInstancesURL** will be used.

- **Authentication URL configuration:** enable the **Authentication URL** configuration if the backend integration supports the Authentication URL. Moreover, in this section the administrator can select the *Allow users to change their own password directly from RemotEye Lite* option, enabling users to

update their own password directly through RemotEye Lite. The Authenticate URL must support this mechanism.

In this section it is also possible to enable the ‘Allow users to change their own password directly from RemotEye Lite’ option which, when supported by the backend, allows for users to change their own password directly from RemotEye Lite web interface.

- **Remote AE Titles configuration:** enable the **Query AE Titles URL** configuration if the backend integration supports the Query AE Titles URL.
- **Notify Client Will Load Instances:** enable the Notify Client Will Load Instances URL configuration if the backend integration supports the Notify Client Will Load Instances.
- **Periodic URL calls:** set up one or more URLs that RemotEye Lite will call periodically. The URLs can contain two key words (`_AUTHTOKEN_` and `_CLISESSID_`) which take the value of the current execution.
- **License Manager configuration:** enable the **License Manager URL** if the backend integration uses a dedicate URL in order to submit license request to the **License Manager for RemotEye**. If a URL is not provided, then RemotEye Lite server will try to contact the license manager by itself using the **License manager hostname** and the **License manager port**.

By clicking the **Save** button, the configuration will be saved and automatically applied.

### 6.3 Image quality

Users can access the **Image quality** section by clicking the  icon on the left toolbar.

This section contains the list of *Image generation rules* that RemotEye Lite server will abide when delivering images to clients.

Image generation rules

Image generation rules define the kind of images that will be served to clients, depending on properties of the clients themselves

User Agent	Screen resolution	Subsample Px. Threshold	JPEG quality
Any value	>= 2073600px	4194304px	80%
Any value	Any value	4194304px	80%

Move up
Move down
Edit
Remove
New

Save

By clicking the *New* or *Edit* buttons, the following dialog will be displayed:

### Details of the rule

**If the request comes from a device having:**

Browser's user agent

Any value ▾ Netscape Navigator 2.0

Smartphones Tablets

Screen resolution

Any value ▾ 480000

The screen resolution of the device in pixel, calculated by multiplying the width and the height. I.E.:  
1920x1080 = 2073600

**Then serve images having:**

JPEG image format

JPEG quality

50 %

Defines the quality of the generated JPG images, where 100% is the best possible quality

PNG image format

**Important: RemotEye Lite generates and serves JPEG/PNG images to the sole purpose of speeding up the loading process of the study and the navigation among its images. Original DICOM images will be served to users, possibly subsampled depending on the defined rules, as soon as the images are hanged to the screen**

**Default Subsample pixel threshold:**

262144 px

Defines the maximum number of pixels an image should contain. If the image exceeds this value then it will be resized to the specified value

**Enable the JPEG passthrough**

Optimizes JPEG images generation in case the original DICOM file is already compressed

Save Cancel

The fields inside this dialog allow users to configure an *Image generation rule*. A description of the available fields follows:

<b>Input parameters</b>	
Browser's user agent	If different than 'Any value' then RemotEye Lite server will utilize the specified value as matching parameter on the user agent of the browser. The Smartphones and Tablets buttons can be used to quickly add a regular expression matching respectively smartphones or tablets devices.
Screen resolution	If different than 'Any value' then RemotEye Lite server will utilize the specified value as matching parameter on the resolution of the screen of the device connecting to the service. This value is expressed as total amount of pixels available to the device, i.e: 1920x1080 = 2073600

<b>Output parameter (generated images)</b>	
Image type	Defines whether images delivered to the client will be in JPEG format (lossy) or PNG (lossless). In the first case it also defines the quality of the delivered image, where 100% is the best quality available.
Default subsample pixel threshold	Defines the maximum number of pixels an image should contain. If the image exceeds this value, then it will be resized to the specified one. This value is expressed as the total amount of pixels an image should have, i.e.: 512x512 = 262,144. Images exceeding the specified value will be subsampled and a warning overlay "SUBSAMPLED" will be shown by RemotEye Lite viewer. This configuration is useful in order to support low end devices which might not be capable enough to render a full 16bit/12bit pixel matrix on their screens.
Enable the JPEG pass-through	Optimizes JPEG images generation in case the original DICOM files is already compressed with that transfer syntax. In that case the original compressed image will be delivered to the client.



**Warning:** RemotEye Lite generates and serves JPEG/PNG images to the sole purpose of speeding up the loading process of the study and the navigation among its images.

Original DICOM images will be served to users, possibly subsampled depending on the defined rules, as soon as the images are hanged to the screen.

In order to provide diagnostic-valid image the following Output Parameters shall be setup:

<b>Output parameter (generated images)</b>	
Image type	PNG image format.

Default subsample pixel threshold	100,000,000, allowing for 10000x10000 images. This value shall be increased in case of images having even greater resolution.
Enable the JPEG pass-through	Disabled.

And it shall match the devices which will be used for diagnostic purposes.

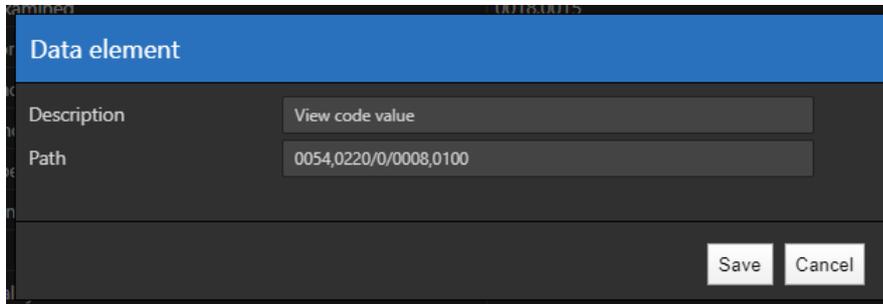
## 6.4 Datasets

Users can access the **Datasets** section by clicking the  on the left toolbar.

This sections displays the list of DICOM data elements that will be returned to the clients as information per each DICOM file.

The web page presents two separate tables:

1. A table containing a list of fixed data elements that will always be present as part of the dataset returned to the clients.
2. A table containing additional data elements which can be edited by the user. By clicking the *New* or *Edit* buttons the following dialog will appear:



Here the user will be able to specify a “Description” (used to identify the value in the table) and its *DICOM path*. As you can see in the above image, any DICOM data element existing in a DICOM dataset can be reached by means of a proper syntax: if it is a “root” element, a single DICOM tag is sufficient to identify the attribute (i.e: 0010,0020 for the Patient ID data element). A “non-root” data element of a DICOM dataset can also be reached, by means of a path-like syntax, as shown in the second field in the image above.



**Warning:** RemotEye Lite caches the information defined below. By adding or removing data elements, RemotEye Lite will automatically invalidate its cache, deleting its entire content.

This operation might take a few seconds depending on the actual size of the cache.

## 6.5 Extras

Users can access the **Extras** section by clicking the  icon in the left toolbar.

This section allows configuration of miscellaneous details, described in the list below:

**Log Configuration**

Enable log files production

RemotEye Lite server's log path:

A path, on the server machine, where RemotEye Lite server will store its log files.

**Extras**

Enable encryption of parameters p1...pN passed to the DisplayStudy.html page

By enabling this option, parameters p1...pN that are passed to the DisplayStudy.html will be considered as encrypted. You will have to select the cipher algorithm, initialization vector and password in order to let RemotEye Lite know how to correctly decrypt such values.

**Important note:** RemotEye Lite will consider all parameters as encrypted in case this option is enabled and a p1...pN parameter is passed.

**Cipher algorithm**

**Initialization Vector (IV)**

The keyword <re\_date> can be used to let the IV become the current date, in the YYYYMMDD format, i.e: 19000101.

**Password**

**Important note:** The Initialization Vector (IV) and password will be hashed using the md-5 algorithm. Bytes (128 bits) returned by such operation will be used as IV and key to initialize the cipher algorithm.

Enable automatic logoff of inactive users

Automatically logoff users if they have been inactive for  seconds

By activating this option, users that have been inactive for the set amount of time will be automatically logged off from RemotEye Lite.

Default date format

Default format for dates displayed by RemotEye Lite. This configuration can be overridden by user preferences

Default name format

Default format for names displayed by RemotEye Lite. This configuration can be overridden by user preferences

Default date range filter

Today  Last 2 days  Last 7 days  Last 30 days

Date range used by the default search filter. This configuration can be overridden by user preferences

- **Log Configuration:** enable the log files production in order to produce log files in the path specified by the **RemotEye Lite Server's log path**.
- **Enable Encryption of parameters p1...pN passed to the DisplayStudy.html page:** by enabling this option, parameters p1...pN that are passed to the DisplayStudy.html will be considered as encrypted. Integrators will have to select the cipher algorithm among the ones supported, the

initialization vector value and a password in order to let RemotEye Lite know how to correctly decipher such values.

**Important note:** RemotEye Lite will consider **all** parameters as encrypted in case the option is enable and a p1...pN parameter is passed by the request.

- **Enable automatic logoff of inactive users:** by activating this option, users that have been inactive for the set amount of time will be automatically logged off from RemotEye Lite.
- **Default date format:** defines the default format of date fields which will be displayed by RemotEye Lite. User's preferences take precedence over this configuration.
- **Default name format:** defines the default format of 'name' fields which will be displayed by RemotEye Lite. User's preferences take precedence over this configuration.
- **Default date range filter:** defines the date range which will be used by default while performing a query. User's preferences take precedence over this configuration.

## 6.6 About

Users can access the **About** section by clicking the  icon on the left toolbar.

This section displays information and reminders about RemotEye Lite and the RemotEye suite software as displayed below.

### About RemotEye Lite



**RemotEye Lite, version 3.0.0**  
Diagnostic web DICOM viewer  
Copyright (C) 2002 - 2019 - NeoLogica

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Contact NeoLogica at:  
[info@neologica.it](mailto:info@neologica.it)  
<http://www.neologica.it>

 Read the User Manual before use

RemotEye Lite is part of the **RemotEye Suite** product.

 According to the guidelines stated in Directive 93/42 of the European Community, as later modified by Directive 2007/47, RemotEye Lite is a Class IIa Medical Device. RemotEye Lite satisfies the requirements for bearing the CE mark on its labelling.

## 7 RemotEye Lite web interface

RemotEye Lite web interface is the part of this software module that let remote users to view DICOM images stored on a RemotEye Viewer compatible backend using a web enabled device. This interface is entitled to communicate with the RemotEye Lite server in order to search for studies, retrieve them and, finally, show images on remotes displays.

The RemotEye Lite web interface can be accessed by entering the following URL:

<http://<yourserver>:<yourport>/Viewer>

The interface consists of several pages/sections that let the user search through the backend studies and display them.

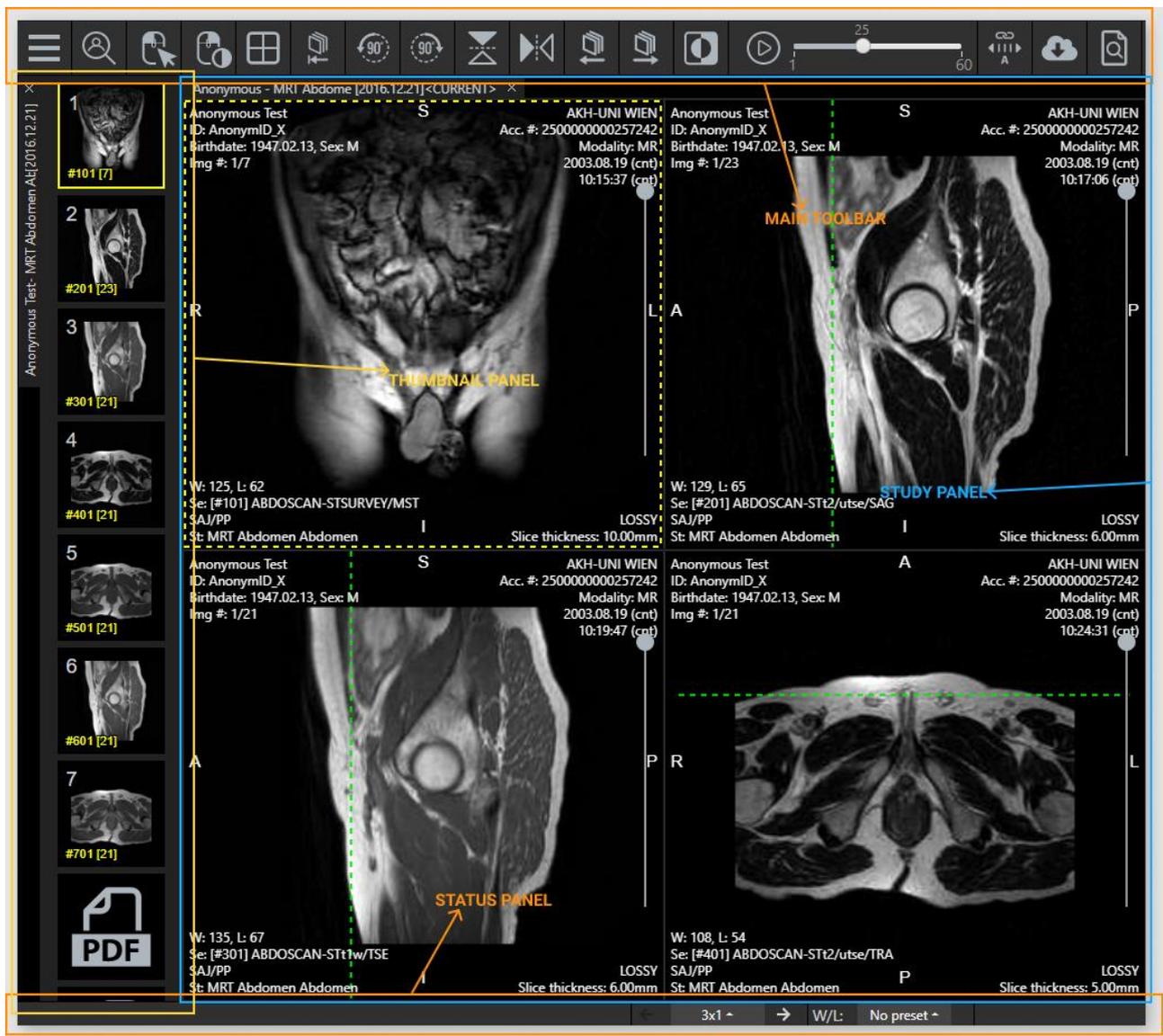
The GUI is composed of the following main panel and toolbars:

- *Main toolbar*: this toolbar contains buttons which allow performing the most common operations in RemotEye Lite, such as loading DICOM files and selecting the tools associated with each mouse button. Basically this is the main menu of RemotEye Lite.
- *Study panel(s)*: each study loaded in RemotEye Lite is displayed in its own *study panel*. By default, multiple study panels are arranged in a “tabbed” fashion. However, it is possible to manually drag the

tab title of each study panel to arrange and dock the panel according to the user's preference (i.e. ub a side-by-side fashion).

- *Series panel(s)*: each study panel contains one or more *series panels*, depending on the series tiling currently set on the study panel. Each series panel contains and shows images belonging to a given series or sequence.
- *Thumbnails panel*: this panel displays thumbnail images. The thumbnails represent the available series grouped by study.
- *Status panel*: this panel, located at the bottom of the screen, contains easy to use tools users can access to perform actions on the selected study panel/series panel. The *status panel* also contains the progress bar used by RemotEye Lite to update the user about progress of activities.

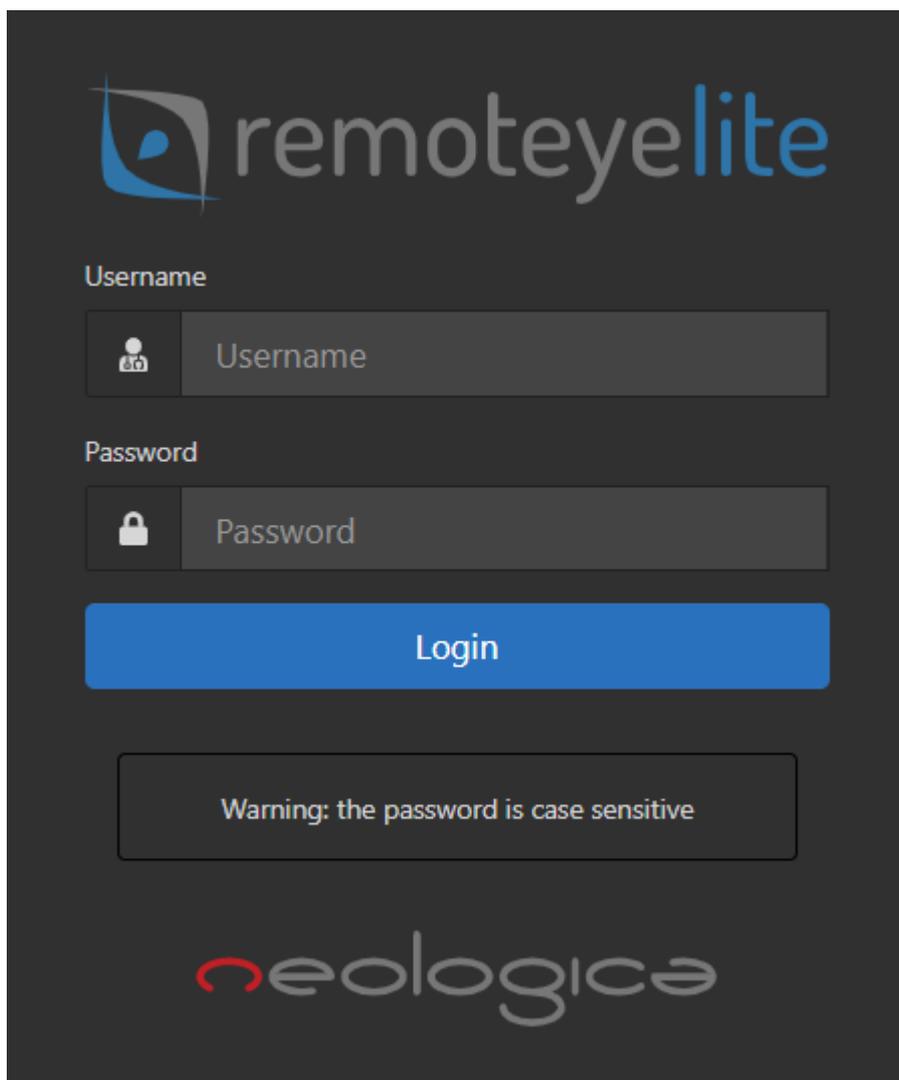
The following figure shows a screenshot of RemotEye Lite's GUI with the main panels clearly shown:



The following sections provide a detailed description of each element of the GUI, as well as of the related features.

## 7.1 Authentication

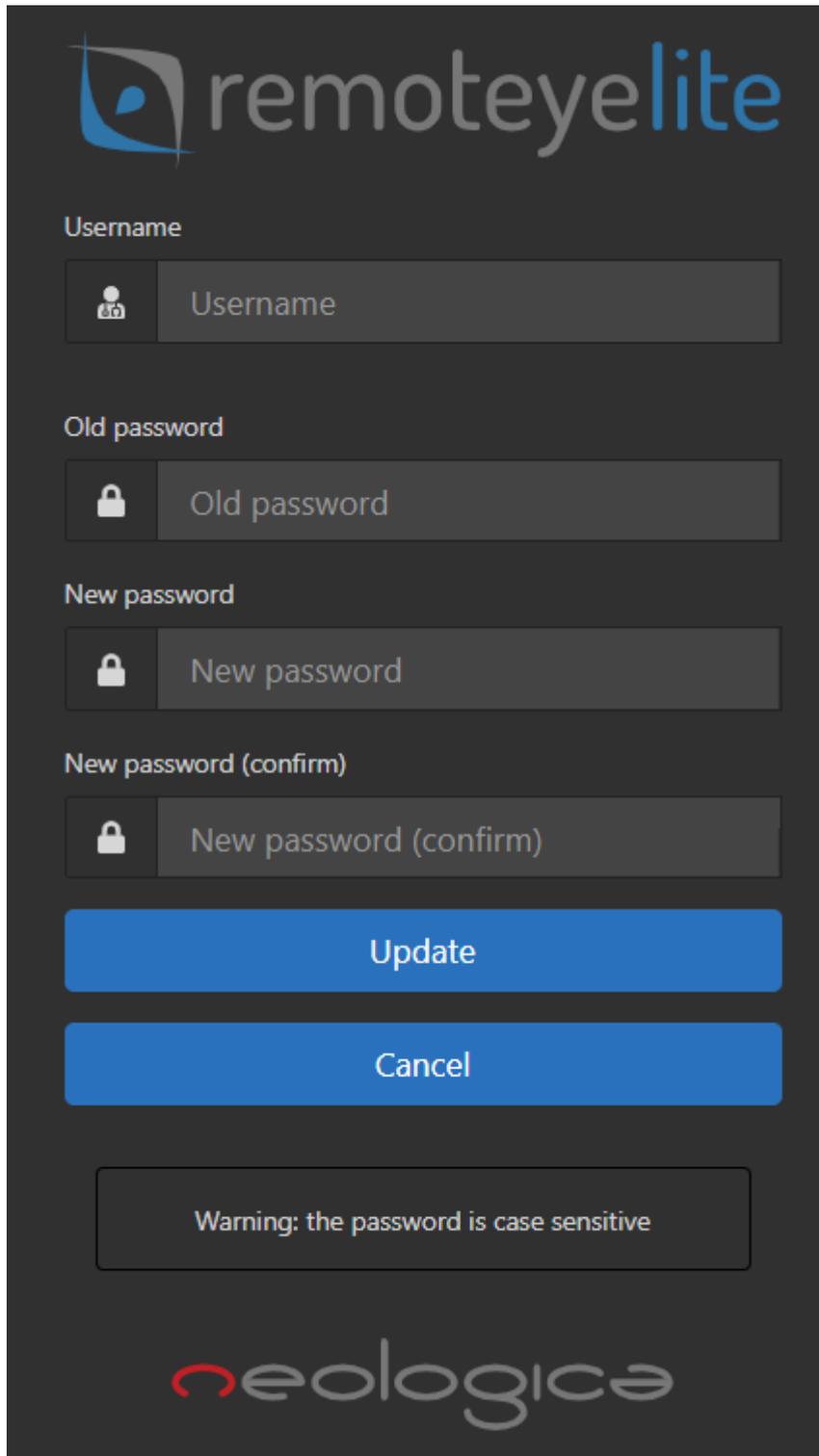
The authentication section is displayed each time the web interface is entered. Based on the value of the **Authentication URL** configuration (see paragraph 5.2) the following dialog will be shown:



The screenshot shows the authentication interface for RemotEye Lite. It features a dark grey background. At the top left, there is a logo consisting of a blue square with a white circle inside, followed by the text 'remoteyelite' in a light blue, sans-serif font. Below the logo, there are two input fields. The first is labeled 'Username' and contains a person icon and the placeholder text 'Username'. The second is labeled 'Password' and contains a lock icon and the placeholder text 'Password'. Below these fields is a prominent blue button with the text 'Login' in white. Underneath the button is a warning box with a thin border containing the text 'Warning: the password is case sensitive'. At the bottom of the dialog, the 'neologica' logo is displayed in a light grey, sans-serif font.

If the **Authentication URL** has been activated, then the access to this page is restricted to the users allowed to enter the RemotEye Viewer backend integration only.

The *Change password* button (when present) allows users to modify the credentials linked to an account:



The screenshot shows a dark-themed user interface for updating a password. At the top left is the 'remoteyelite' logo. Below it are four input fields, each with a label and a corresponding icon: 'Username' with a person icon, 'Old password' with a lock icon, 'New password' with a lock icon, and 'New password (confirm)' with a lock icon. Below the input fields are two blue buttons labeled 'Update' and 'Cancel'. At the bottom of the form is a warning box with the text 'Warning: the password is case sensitive'. The 'neologica' logo is visible at the bottom of the interface.

The same page will be displayed in case the integration with the back-end allows the password to expire.

Once valid login information is provided the main page will fade in as demonstrated below:

## Find Patients/Studies

←
60
⏮ A ⏭
☁

Patient name

Patient ID

Accession #

Study description

Ref. Physician

Modality

Performed after

Performed before

Today
Last 2 days
Last week
Last month
Any date

Calling ae title

Called ae title

👁 Open

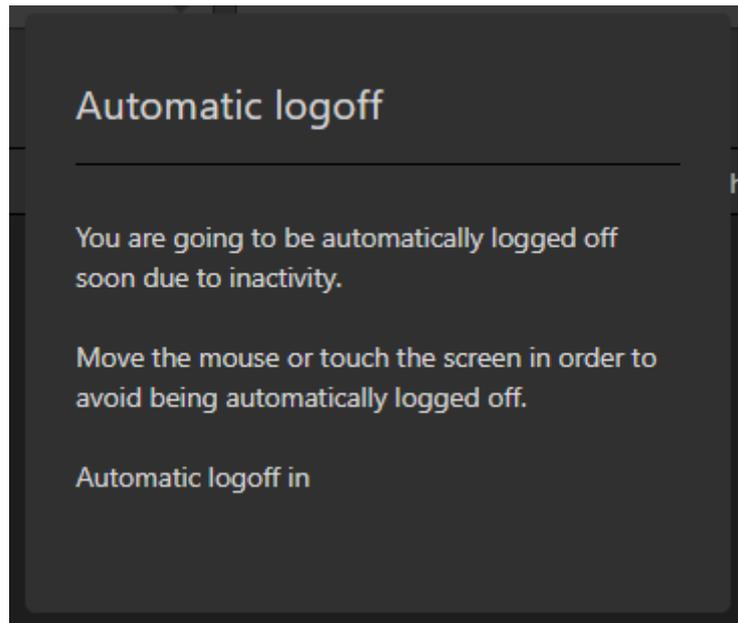
+ Add

🔍 Search

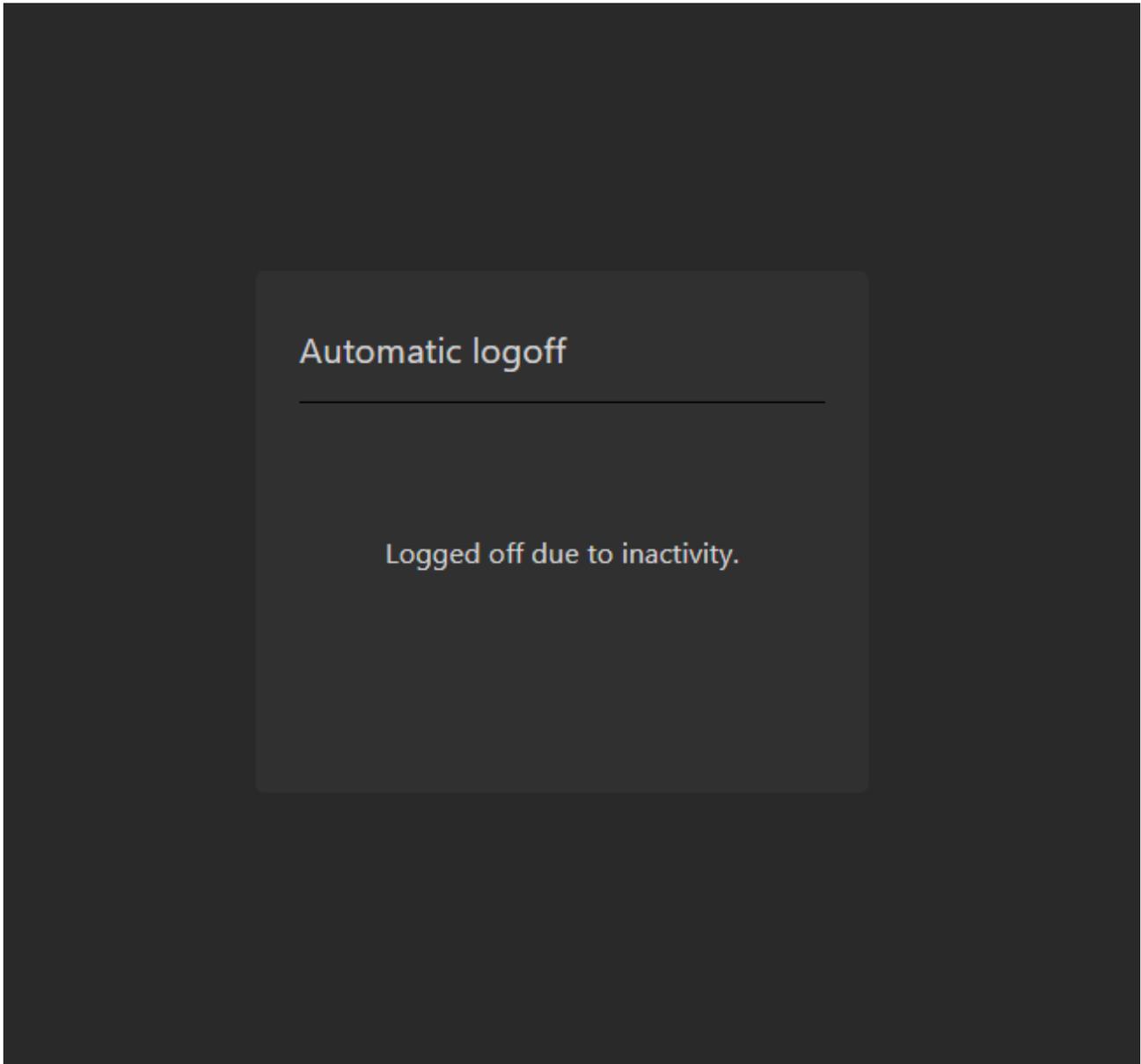
Name	Study description	Study date	Accession number	Ref. Physician	Modality

Users will be greeted with the “Find Patients/Studies” where they will be able to search for patients and studies.

It is worth to be noted that if the administrator has enabled the automatic log off option, then the following message will appear after the user is inactive for the set amount of time:



If the timeout shown in the previous message ends, then the user will be logged off:



A refresh of the web page will be required in order to request a new access.

## 7.2 *Main toolbar*

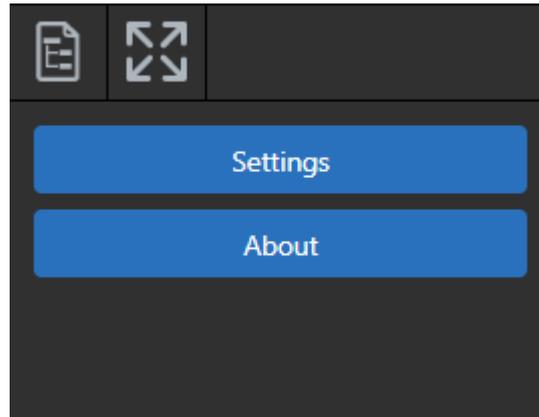
The *Main toolbar* of RemotEye Lite acts as its main menu, since it's the access point to all main operations and features supported by the viewer.

### 7.2.1 *Overflow panel*

The *Overflow panel* icon is the first available icon within the *Main toolbar*.



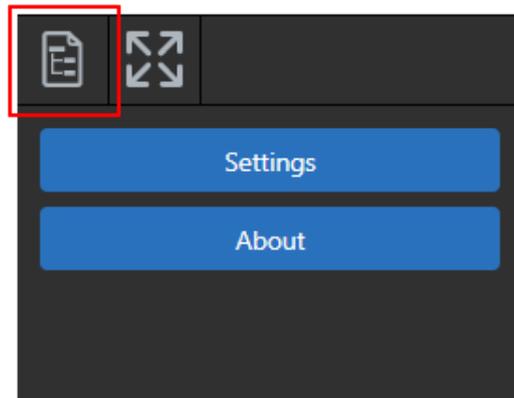
The icon grant access to the *Overflow panel*. This panel is a special section of the viewer that contains less used actions and links, as well as icons that does not fit in the *Main toolbar* due to physical constraints of the device.



Regardless of the physical constraints of the device, the *Overflow panel* contains the links to the functionalities detailed below.

### 7.2.1.1 DICOM dump

The *DICOM dump* functionality can be accessed via the *Overflow panel* by utilizing the highlighted icon below:



In order for the functionality to work correctly, at least one *image panel* must be selected inside a *study panel*.

A click on the icon will show the *DICOM dump* section, containing the all the DICOM data elements related to the selected image:

Field name	Tag	Offset	VR	Value length	Content
File Meta Information Group Length	0002,0000	132	UL	4	192
File Meta Information Version	0002,0001	144	OB	2	[blob of 2 bytes]
Media Storage SOP Class UID	0002,0002	158	UI	26	1.2.840.10008.5.1.4.1.1.4
Media Storage SOP Instance UID	0002,0003	192	UI	42	1.3.6.1.4.1.18047.1.6.1999991517828387786
Transfer Syntax UID	0002,0010	242	UI	22	1.2.840.10008.1.2.4.50
Implementation Class UID	0002,0012	272	UI	22	1.3.6.1.4.1.18047.1.8
Implementation Version Name	0002,0013	302	SH	8	LOGIPACS
Source Application Entity Title	0002,0016	318	AE	10	LPDEVEL03
Specific Character Set	0008,0005	336	CS	10	ISO_IR 100
Image Type	0008,0008	354	CS	28	DERIVED\PRIMARY\M_FFE\M_FFE
Instance Creation Date	0008,0012	390	DA	8	20030819
Instance Creation Time	0008,0013	406	TM	14	144107.000000
Instance Creator UID	0008,0014	428	UI	24	1.3.46.670589.11.4001.5
SOP Class UID	0008,0016	460	UI	26	1.2.840.10008.5.1.4.1.1.4
SOP Instance UID	0008,0018	494	UI	42	1.3.6.1.4.1.18047.1.6.1999991517828387786
Study Date	0008,0020	544	DA	8	20180212
Series Date	0008,0021	560	DA	8	20030819
Content Date	0008,0023	576	DA	8	20030819
Study Time	0008,0030	592	TM	6	160937
Series Time	0008,0031	606	TM	14	101537.940000
Content Time	0008,0033	628	TM	14	101537.940000
Accession Number	0008,0050	650	SH	8	AccNum_3
Modality	0008,0060	666	CS	2	MR
Modalities in Study	0008,0061	676	CS	2	MR
SOP Classes in Study	0008,0062	686	UI	0	
Manufacturer	0008,0070	694	LO	24	Philips Medical Systems
Institution Name	0008,0080	726	LO	10	NEOLOGICA
Referring Physician's Name	0008,0090	744	PN	16	NEOLOGICA^DOCTOR
Station Name	0008,1010	768	SH	6	T10NT1
Study Description	0008,1030	782	LO	20	MRT Abdomen Abdomen
Series Description	0008,103E	810	LO	22	ABDOSCANA-STSURVEY/MST

Each row of the table represents a DICOM data element, with its *Tag*, *Offset* in bytes from the start of the file, its *Value representation (VR)*, its *Value length* in bytes and its *Content*.

In case of data elements which *Value representation* is SQ, the actual row will be clickable in order to let the user obtain and display its children items:

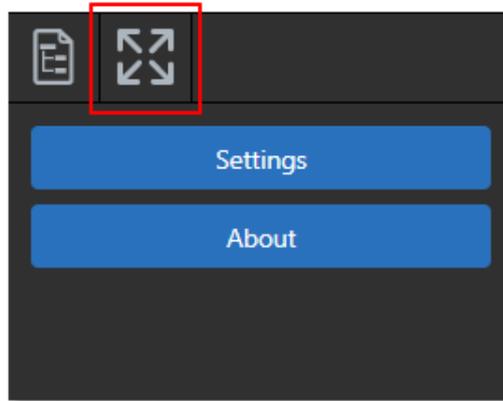
Derivation Code Sequence	0008,9215	1064	SQ	4294967295	1 items
Item 0					
Code Value	0008,0100	1084	SH	6	121327
Coding Scheme Designator	0008,0102	1098	SH	4	DCM
Code Meaning	0008,0104	1110	LO	20	Full fidelity image

**Important note:** depending on the physical resolution of the display of the device being utilized, some information might be hidden or collapsed. Below you can find a screenshot of the different layout of the *DICOM dump* section when displayed on a smartphone:

Field name	Tag	VR	Content
File Meta Information Group Length	0002,0000	UL	192
File Meta Information Version	0002,0001	OB	[blob of 2 bytes]
Media Storage SOP Class UID	0002,0002	UI	1.2.840.10008.5.1.4.1.1.4
Media Storage SOP Instance UID	0002,0003	UI	1.3.6.1.4.1.18047.1.6.199999151728387786
Transfer Syntax UID	0002,0010	UI	1.2.840.10008.1.2.4.50
Implementation Class UID	0002,0012	UI	1.3.6.1.4.1.18047.1.8
Implementation Version Name	0002,0013	SH	LOGIPACS
Source Application Entity Title	0002,0016	AE	LPDEVEL03
Specific Character Set	0008,0005	CS	ISO_IR 100
Image Type	0008,0008	CS	DERIVED\PRIMARY\M_FFE\M_FF
Instance Creation Date	0008,0012	DA	20030819
Instance Creation Time	0008,0013	TM	144107.000000
Instance Creator UID	0008,0014	UI	1.3.46.670589.11.4001.5
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.4

### 7.2.1.2 Full screen

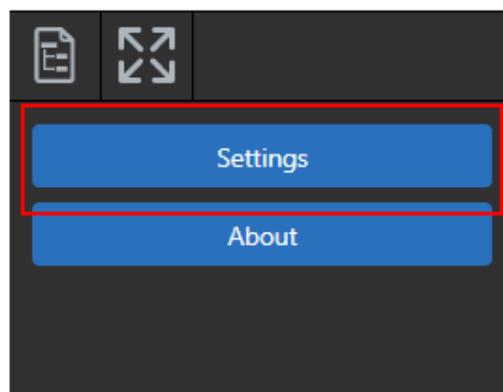
The *Full screen* functionality can be accessed via the *Overflow panel* by utilizing the highlighted icon below:



A simple click on the icon will render the web interface at full screen. The action required to return from the full screen mode might be different depending on the browser utilized. Usually, by pressing the ESC or F11 key will allow users to exit from the full screen mode.

### 7.2.1.3 Settings

The *Settings* section can be accessed via the *Overflow panel* by utilizing the highlighted button below:

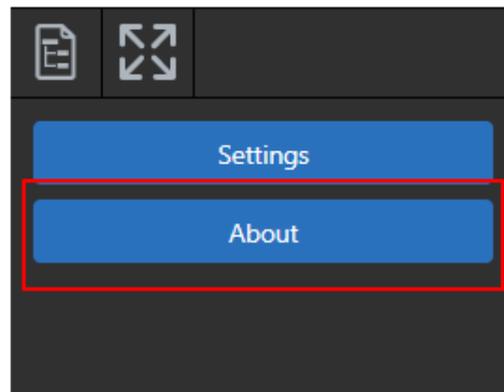


Access to the button and to the *Settings* section might be denied depending on the configuration of the backend.

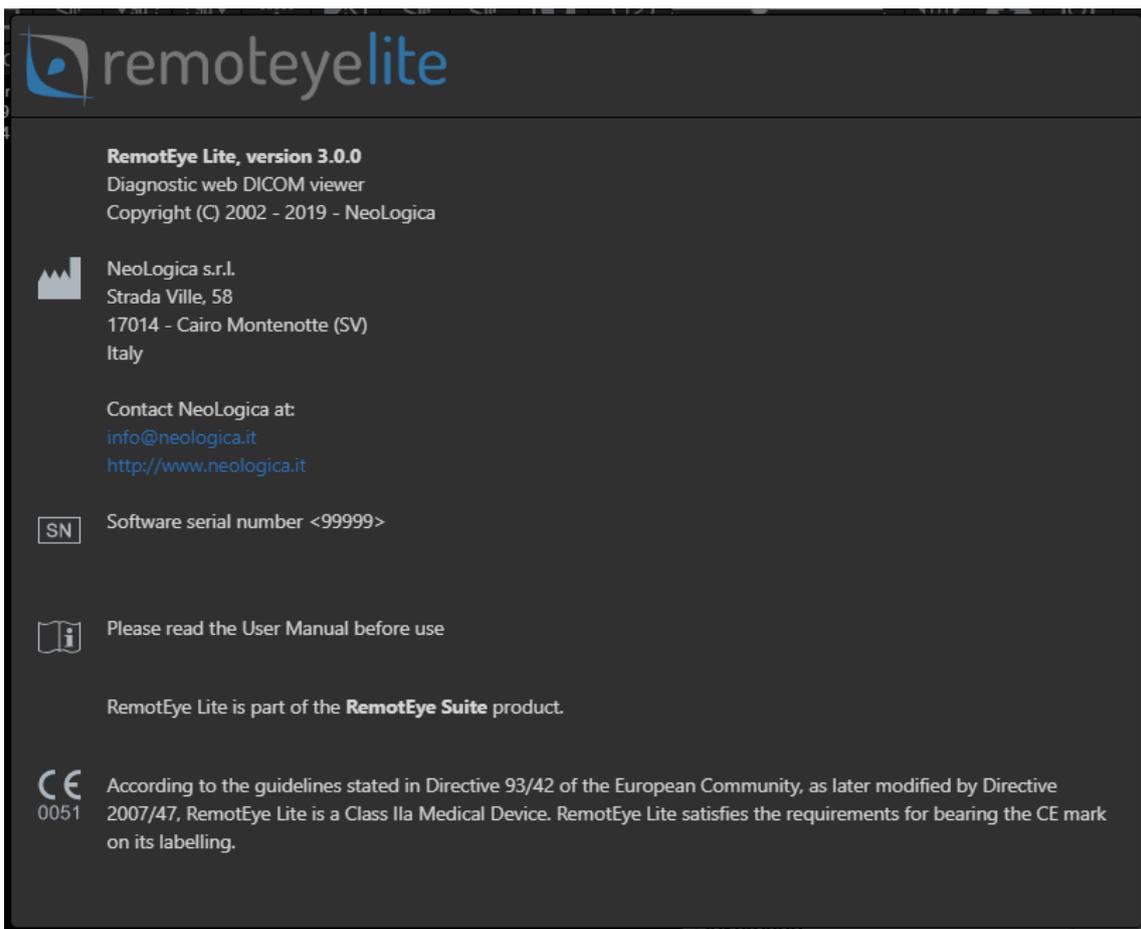
The configurations available in the *Settings* section will be detailed in chapter 7.

### 7.2.1.4 About

The *About* section can be accessed via the *Overflow panel* by utilizing the highlighted button below:



By pressing the button, the *About* dialog will be shown, as depicted in the following picture:



## 7.2.2 Patients / Studies

The *Find Patients / Studies* search page displays a list of studies that satisfy the query issued to the RemotEye Viewer backend. Users are redirected to this section automatically after they log in, but it can also be opened by clicking on the icon displayed below:



The content of the section is displayed with the following picture:

## Find Patients/Studies

Patient name
Patient ID
Accession #

Study description
Ref. Physician
Modality

Performed after
Performed before

Today
Last 2 days
Last week
Last month
Any date

Calling ae title
Called ae title

Open
+ Add
Search

Name	Study description	Study date	Accession number	Ref. Physician	Modality
Anonymous Patient10	ABDOMEN^3D W/O & W/	2019.01.03	1-78114	12118-78069-1-3-RA...	MR
Anonymous Patient14	C-SPINE^CERVICAL SPINE	2019.01.03		904-110631-186-2-R...	MR
Anonymous Patient14	SHOULDER^RT SHOULDER	2019.01.03		904-110631-186-2-R...	MR
Anonymous Patient1	Endoscopy-Esophagus	2018.12.13			RF
Anonymous Patient1	Standard Screening - Combo	2018.11.20	2054817112018		SR, MG
Anonymous Patient1	RX COLONNA LOMBOSACRALE	2018.08.17	5537181		DX, PR, OT
Anonymous Patient120180622	TDM THORAX	2018.06.21	0638822182		CT, SR
Anon Patient	CT con contrasto	2018.04.13	111222		CT, OT, SR
PATIENT ANONYMOUS	MRT Abdomen Abdomen	2018.02.12	AccNum_3	NEOLOGICA DOCTOR	MR
PATIENT ANONYMOUS	LOMBOSACRALE	2018.02.12	AccNum_4	NEOLOGICA DOCTOR	MR
PATIENT ANONYMOUS	Chest	2018.02.05	AccNum_2	NEOLOGICA DOCTOR	CR
PATIENT ANONYMOUS	Abdomen	2018.02.04	AccNum_1	NEOLOGICA DOCTOR	CR
Anonymous Test		2018.01.23	1801231257160904		US, OT
Anon Multi	Chest	2017.07.06	SO0544144	TEST TEST	CR
Anonymous Patient201707043		2017.07.04	BR0102816		CR

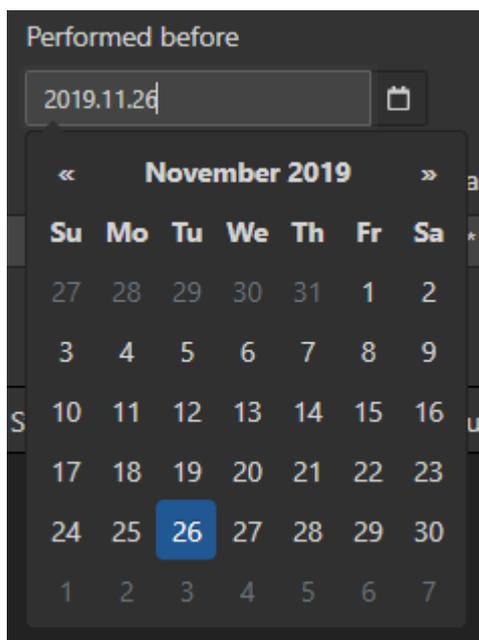
The first section of the page consists of a powerful search filter that the user can customize in order to facilitate the search of specific patients / studies.

The following search parameters are supported:

- *Patient name*
- *Patient ID*
- *Accession number*
- *Study description*

- *Referring physician name*
- *Modality*
- *Study date*
- *Calling ae title* (only available if the Query AE Title URL has been configured)
- *Called ae title* (only available if the Query AE Title URL has been configured)

The *Study date* parameter can be set by means of an easy-to-use date-picker or by simply inserting a value with the keyboard following the YYYY.MM.DD format:



*Today, Last 2 days, Last Week, Last month and Any date* button can also be utilized to quickly set the date.

**Important note:** the initial date range can be configured for all users by accessing RemotEye Lite configuration page.

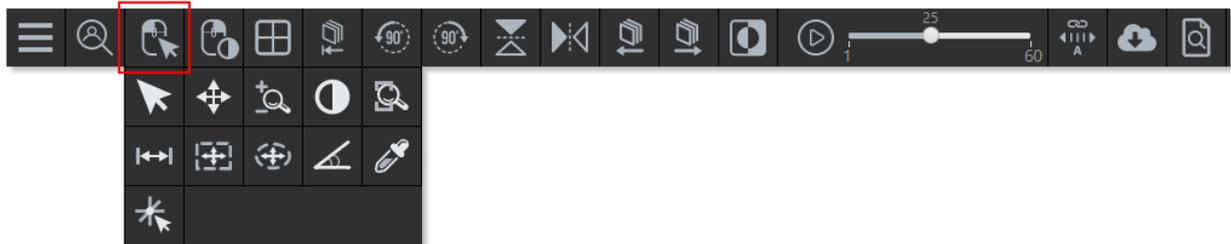
The *Search* button located at the bottom of the filter can be used to hide the filter itself and perform the desired query. A click on the downward facing arrow present beside the *Search* button will render the filter portion visible again.

The list of studies matching the configured filter will be displayed as a table. A single click on the row related to a study will select it. The *Open* button can be used to load the selected studies closing any previously opened ones, while the *Add* button can be used to append the selected studies as new study panels. Both the *Open* and *Add* present a downward facing arrow beside them. That arrow can be used to require a '*Fresh copy*' of the studies being loaded. By requesting an operation like that, you will inform RemotEye Lite to clear any previously-cached information of the study(ies) before re-loading it.

### 7.2.3 Association of tools with mouse buttons / touch action

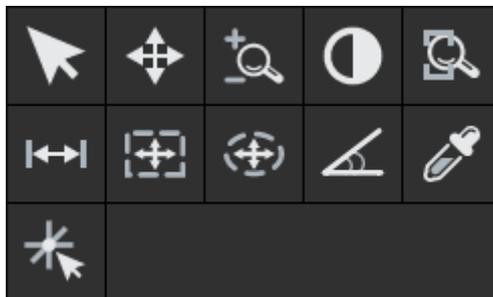
RemotEye Lite supports a completely flexible association between mouse buttons and image manipulation tools.

The highlighted button in the picture below may be used to hide or show buttons relative to the association of tools with mouse buttons / touch actions:



When moving the mouse pointer over each single association of tools with mouse's button, a tooltip text will appear, providing additional information about the function of the buttons themselves.

The *Associate tool with LEFT mouse button* toolbar button (  ) can be used to associate an image manipulation tool with the left mouse button. If you press this toolbar button, the following drop-down menu will appear:



The *Associate tool with RIGHT mouse button* toolbar button (  ) can be used to associate an image manipulation tool with the right mouse button. If you press this toolbar button, the same drop-down menu as above will appear.

Each available image manipulation tool can be independently associated with the left mouse button and with the right mouse button. All combinations of left / right mouse button tools are supported.

The icon of the tool currently associated with the left and right mouse buttons will appear in the *Main toolbar* next to the left, right and touch icons.

In case RemotEye Lite detects that it is being utilized on a touch-only device (such as smartphones and tablets), one single toolbar button *Associate tool with touch action* () will be displayed in place of the two buttons described before.

In addition to the association of tools to the left / right mouse buttons, RemotEye Lite automatically associate the following tools:

- *Pan image* on the mouse third button
- *Scroll* on the mouse wheel
- *Zoom* on the pinch-to-zoom gesture
- *Pan image* on two finger gesture

The following paragraphs will describe each image manipulation tool.

### 7.2.3.1 Select / Stack image

The *Select/Stack image* tool () allows selecting an image panel on a screen, by a single click on the image. Also, it is possible to scroll through the images of the series by dragging with the associated mouse button over the image ("stack" operation).

### 7.2.3.2 Pan image

The *Pan image* tool () allows panning over the currently selected image, by dragging with the associated mouse button over the image. The same action can be achieved by using the third mouse button or by performing a two finger gesture on an image.

### 7.2.3.3 Zoom image

The *Zoom image* tool () allows performing a zoom-in / zoom-out action on the currently selected image, by dragging with the associated mouse button over the image. The center of the zoom operation is the point clicked initially, at the beginning of the drag operation. The same action can be achieved by using a pinch-to-zoom gesture on touch-enabled devices.

### 7.2.3.4 Window / Level

The *Window / Level* tool () allows modifying the window width and window level values (also known as "window center") for the gray levels (or colors) of the current image. The Window / Level values are given in Hounsfield Units if the selected image panel contains a CT image.

You may change the Window,Level values by dragging with the associated mouse button over the image.

The Window / Level applied to the current image will also be automatically applied to all images of the selected series.

### 7.2.3.5 Magnifier

The *Magnifier* tool () allows magnifying a moving portion of the image, by dragging with the associated mouse button over the image.



The size of the magnificated rectangle will be 200x200 pixel and its content centered with the cursor location.

### 7.2.3.6 Measurement tools

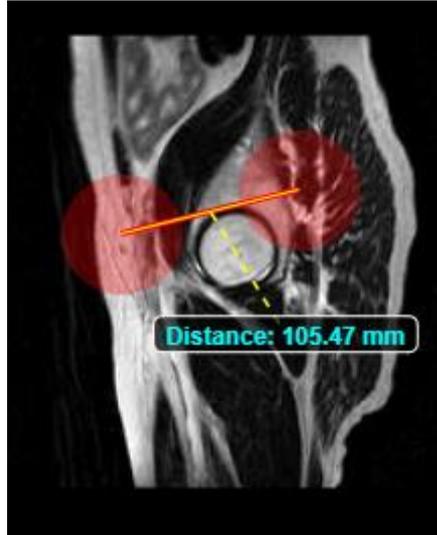
RemotEye Lite supports several measurements tools, described in the following sub-paragraphs.



**Warning:** measurements taken through the RemotEye Lite software are based on pixel-to-millimetres calibration information which is read from the DICOM dataset. This calibration information is stored by the modality which originally acquired the medical images. RemotEye Lite has no mean to guarantee that the calibration information is correct and accurate, hence it has no mean to guarantee that the final measurements taken by the software are actually accurate. It is recommended that the user of RemotEye Lite critically checks the result of each measurement.

#### 7.2.3.6.1 Measure distance

The *Measure distance* tool () allows measuring linear distances on the selected medical image. The measurement is performed by dragging with the associated mouse button over the image, and releasing the mouse button once you traced the distance that you want to measure.



Anchor points will be displayed as soon as the operation is completed which will allow users to move the location of the measurement. A label containing the value of the performed measurement will be also displayed. Users can move the location of the label by simply dragging it. Please be aware that, once the label has been moved, it will stay at the same location of the panel, regardless of the zoom/pan applied to the image.

### 7.2.3.6.2 *Measure rect area*

The *Measure rect area* tool () allows measuring rectangular areas on the selected medical image. Information about the surface, the perimeter, the minimum/maximum/mean density, and the standard deviation of the densities within the rectangular area is provided. The measurement is performed by dragging with the associated mouse button over the image, and releasing the mouse button once you traced the rectangular area that you want to measure.



Anchor points will be displayed as soon as the operation is completed which will allow users to move the location of the measurement. A label containing the value of the performed measurement will be also displayed. Users can move the location of the label by simply dragging it. Please be aware that, once the label has been moved, it will stay at the same location of the panel, regardless of the zoom/pan applied to the image.

### 7.2.3.6.3 *Measure ellipt area*

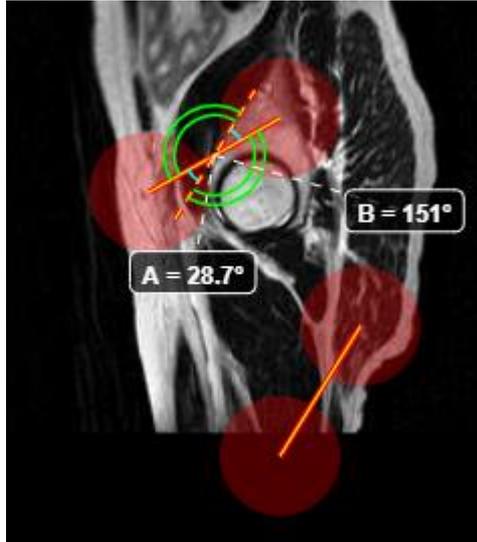
The *Measure ellipt area* tool () allows measuring elliptical areas on the selected medical image. Information about the surface, the perimeter, the minimum/maximum/mean density, and the standard deviation of the densities within the elliptical area is provided. The measurement is performed by dragging with the associated mouse button over the image, and releasing the mouse button once you traced the elliptical area that you want to measure.



Anchor points will be displayed as soon as the operation is completed which will allow users to move the location of the measurement. A label containing the value of the performed measurement will be also displayed. Users can move the location of the label by simply dragging it. Please be aware that, once the label has been moved, it will stay at the same location of the panel, regardless of the zoom/pan applied to the image.

### 7.2.3.6.4 *Measure angle*

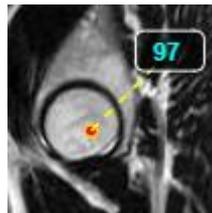
The *Measure angle* tool () allows measuring angles on the selected medical image. The measurement is performed by drawing two segments over the image; each segment can be drawn by dragging with the associated mouse button over the image, and releasing it when each segment has the desired properties.



Anchor points will be displayed as soon as the operation is completed which will allow users to move the location of the measurement. A label containing the value of the performed measurement will be also displayed. Users can move the location of the label by simply dragging it. Please be aware that, once the label has been moved, it will stay at the same location of the panel, regardless of the zoom/pan applied to the image

#### 7.2.3.6.5 Measure density

The *Measure density* tool () allows measuring densities on the selected medical image. The measurement is performed by dragging with the associated mouse button over the image.



#### 7.2.3.7 3D cursor

The *3D cursor* tool () also known as "3D localizer" tool) allows a fast navigation through CT or MR series, and is able to show the location of the point indicated by the mouse cursor (over the current image) also on the other displayed series.

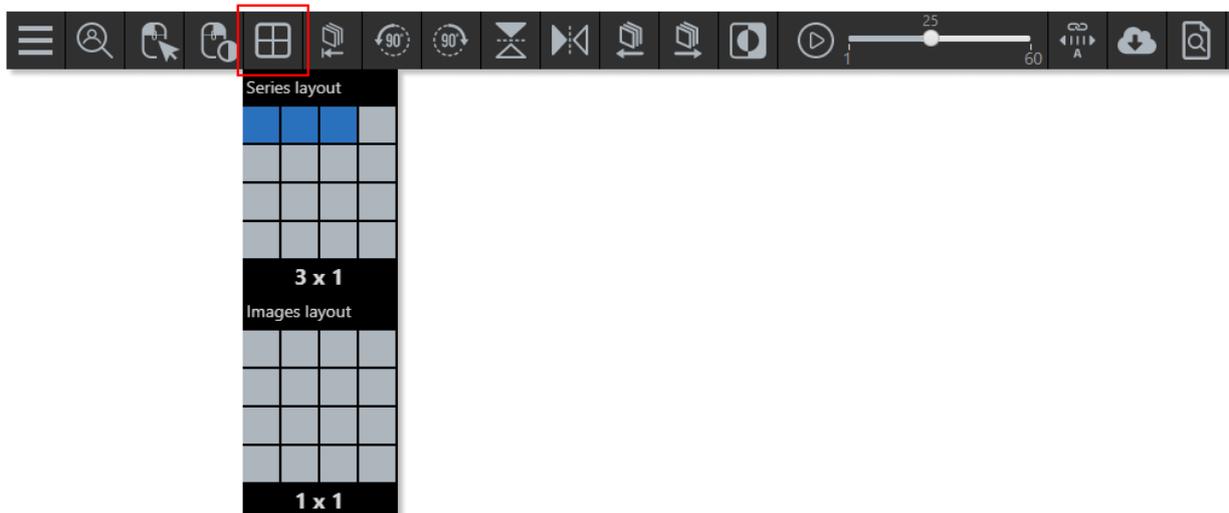
In particular, when the mouse button associated with this tool is pressed or dragged on a particular point of the current image (the "3D point", from now on), the other series are scrolled up to the image containing that same point in the 3D patient coordinates space, and the location of the "3D point" is shown on those images.



**Warning:** the navigation allowed by the 3D cursor tool is generated by a software algorithm. As such, the correctness of the location of the point indicated by the mouse cursor on other series depends on the correctness of several orientation and spacing data stored in the original DICOM datasets, in addition to the correctness of the software algorithm. The viewer itself has no mean to ensure these input data are correct. Hence, the location of the 3D cursor shall be checked and treated in a very “critical” way by the user/radiologist, and any conclusion coming from the location of the 3D cursor shall be carefully evaluated.

#### 7.2.4 Set display mode

The *Set display mode* functionality can be accessed by clicking its related icon in the *Main toolbar*. By pressing the icon, the following drop-down menu will appear:



This section allows defining exactly how series and images are presented within this study panel.

*Series layout* allows specifying the series tiling for the current study. The series tiling determines how many series will be concurrently visible, and their layout on screen.

*Image layout* allows specifying the image tiling for the series panel. The image tiling determines how many images of each series will be concurrently visible, and the layout of images inside the series panel.

#### 7.2.5 Reset

The *Reset* action can be triggered by clicking on the highlighted icon displayed below:



On its activation RemotEye Lite will reset all the images of the selected *series panel*. Zoom, pan, window / level and annotation will be all reset to its default values.

### 7.2.6 Rotate -90

The *Rotate -90* action can be triggered by clicking on the highlighted icon displayed below:



On its activation RemotEye Lite will rotate counter-clockwise all images of the selected *series panel* by 90 degrees.

### 7.2.7 Rotate +90

The *Rotate +90* action can be triggered by clicking on the highlighted icon displayed below:



On its activation RemotEye Lite will rotate clockwise all images of the selected *series panel* by 90 degrees.

### 7.2.8 Flip vertically

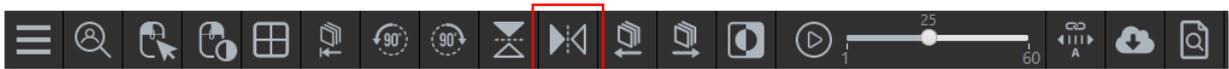
The *Flip vertically* action can be triggered by clicking on the highlighted icon displayed below:



On its activation all images of the selected *series panel* will be flipped vertically.

### 7.2.9 Flip horizontally

The *Reset* action can be triggered by clicking on the highlighted icon displayed below:



On its activation all images of the selected *series panel* will be flipped horizontally.

### 7.2.10 Previous / Next series

The *Previous series* and *Next series* actions can be triggered by clicking on the highlighted icons displayed below:



These two actions allow loading the previous series or next series of the selected study in the selected *series panel*.

### 7.2.11 Invert image

The *Invert image* action can be triggered by clicking on the highlighted icon displayed below:



On its activation the colours of all images of the selected *series panel* will be inverted.

### 7.2.12 Cine-playback functions

The *Cine-playback toolbar buttons* are available with the *Main toolbar*, highlighted in the screenshot below:



RemotEye Lite viewer automatically detects *cine* series during the loading phase. Once this *cine* series are loaded and selected into a *series panel*, RemotEye Lite will take care of selecting the suggested frame rate in the provided slider.

The *Start / Stop* button can be used to trigger playback of the cine series at the rate specified by the slider.

### 7.2.13 Toggle automatic series synchronization

The *Toggle automatic series synchronization* action can be triggered by clicking on the highlighted icon displayed below:



The button allows synchronizing different CT or MR series whose images (slices) were acquired moving in the same direction (acquisition planes with the same orientation). The synchronization causes a scrolling through the images of these series, in such a way all panels show images related to the same patient coordinates (where available). The reference coordinates, at which all other panels are synchronized, are the ones of the currently selected image panel / series. In order to support synchronization of all series, the image tiling of all series panels is automatically set to 1x1. Once the *Toggle automatic series synchronization...* function is enabled, all scrolling operations will be synchronized across the displayed

series. In order to disable the *Toggle automatic series synchronization...* function and the related locked scrolling among series, it is sufficient to click once again on the same toolbar button.



**Warning:** synchronized scrolling functionalities are based on a software algorithm. As such, the proper functioning of sync scrolling depends on the correctness of several orientation and spacing data stored in the original DICOM datasets, in addition to the correctness of the implemented scrolling algorithm. The viewer itself has no mean to ensure these input data are correct. Hence, the proper synchronization of the series shall be checked in a very “critical” way by the user/radiologist, and any conclusion coming from these functionalities shall be carefully evaluated.

### 7.2.14 Download study

The *Download study* action can be triggered by clicking on the highlighted icon displayed below:

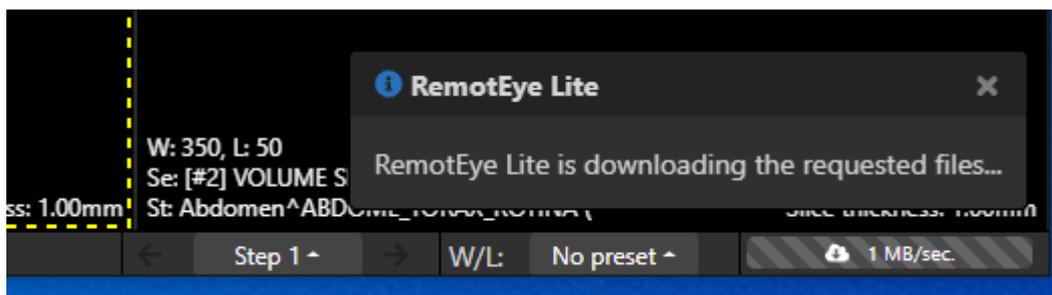


Depending on the backend configuration the *Download study* action might not be present.

The tool allows users to download the original DICOM files related to the selected study as a zip archive.

By clicking the icon, RemotEye Lite will start recovering the DICOM files and preparing the zip archive.

Once the archive is ready, the viewer will proceed downloading the file automatically, providing indication of the progress in the *Status bar*:



### 7.2.15 View report

The *View report* action can be triggered by clicking on the highlighted icon displayed below:

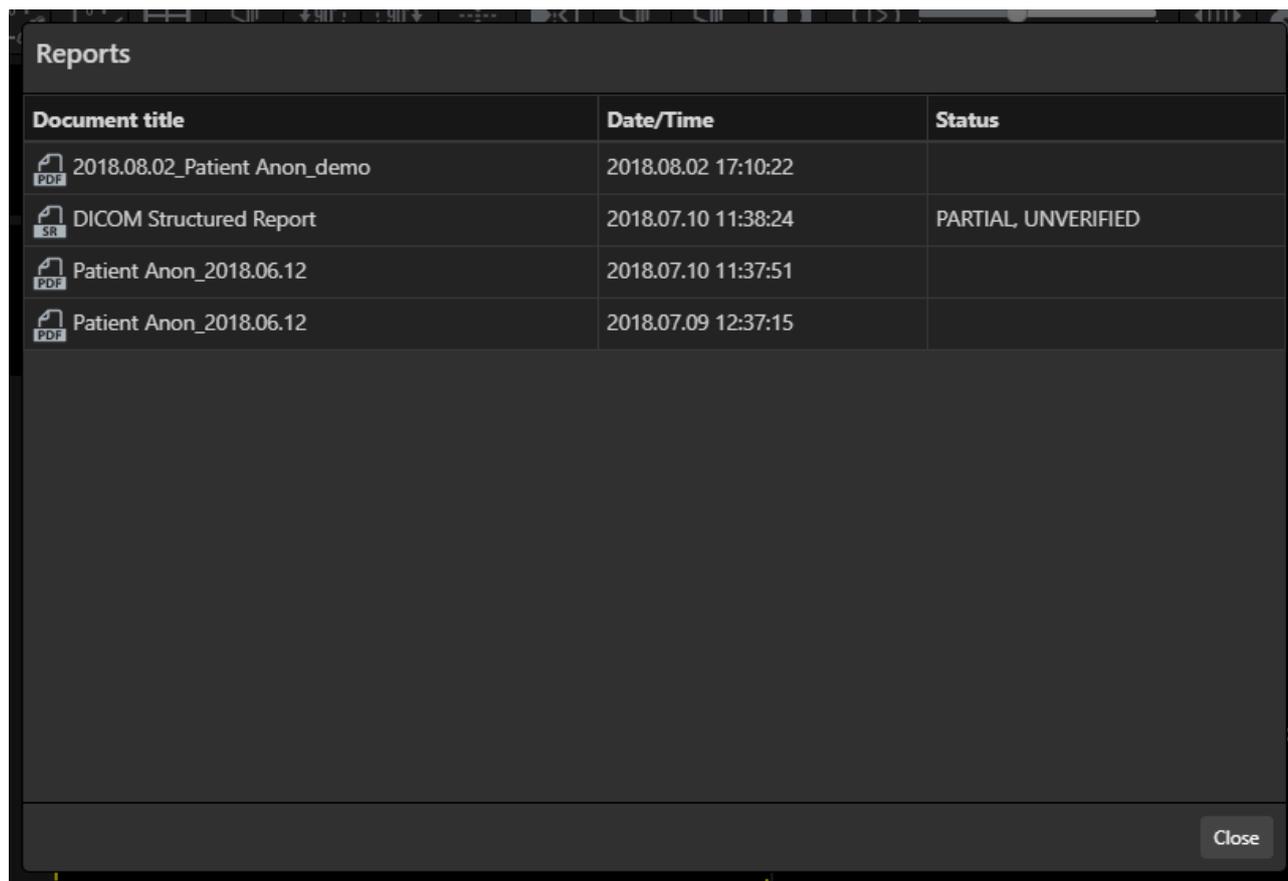


Depending on the backend configuration the *View report* action might not be present.

By clicking the *View report* icon RemotEye Lite will start searching for 'reports' for the currently selected study. RemotEye Lite treats the following files as 'reports':

- DICOM Structure report instances
- DICOM Encapsulated PDF instances

The following dialog will be displayed once RemotEye Lite finishes searching for reports:



The screenshot shows a dialog box titled "Reports" with a table containing the following data:

Document title	Date/Time	Status
 2018.08.02_Patient Anon_demo	2018.08.02 17:10:22	
 DICOM Structured Report	2018.07.10 11:38:24	PARTIAL, UNVERIFIED
 Patient Anon_2018.06.12	2018.07.10 11:37:51	
 Patient Anon_2018.06.12	2018.07.09 12:37:15	

A "Close" button is located in the bottom right corner of the dialog box.

Each line in the dialog represents a report, displaying the document title (in case of DICOM Encapsulated PDFs), the content date time and the report status (in case of DICOM Structured reports).

A single click on a row will trigger the opening of the related report.

### 7.3 Study panels

In RemotEye Lite, each loaded study is displayed in its own dedicated *study panel*, which in turn contains one or more *series panels*. The number and layout of series panels contained in the study panel depends on the series tiling setting (i.e., the number of series columns and series rows).



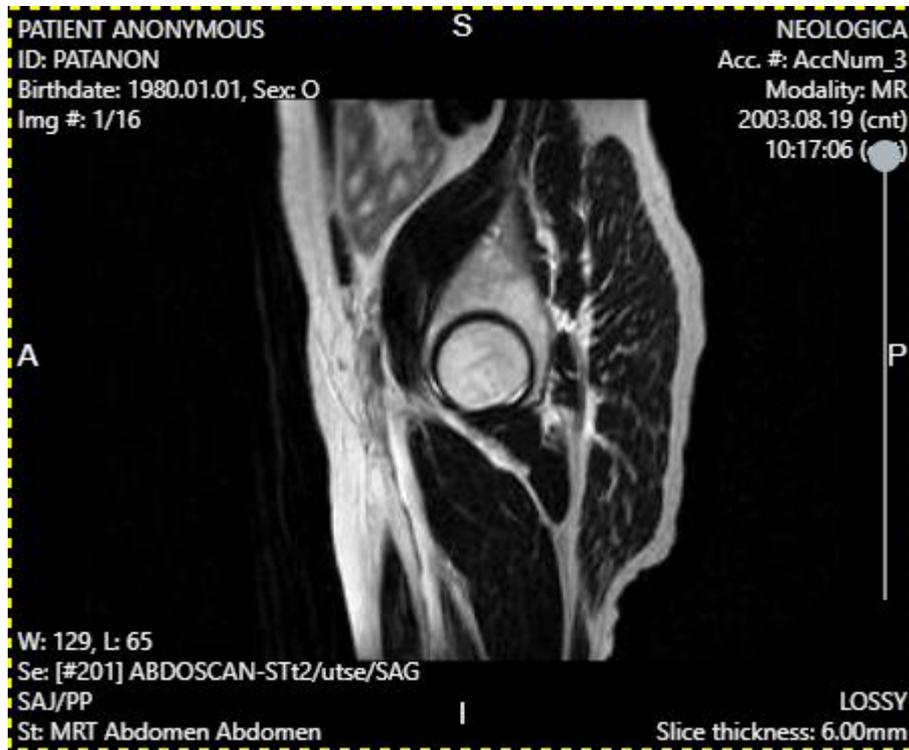
Once the study is open, and several series are displayed on screen, you can maximize a given series (thus switching to 1x1 series tiling and 1x1 image tiling) by double-clicking on it or by performing a long-press gesture. Then, when you are done with this image, you can double-click or perform a long-press gesture again on it in order to return to the previous display mode, and all previously displayed images will be restored on screen.

By default, multiple study panels (corresponding to multiple open studies) are arranged in a "tabbed" fashion. However, it is possible to manually drag the tab title of each study panel to arrange and dock the panel according to the user's preference (e.g., in a side-by-side fashion).

### 7.4 Series panels

RemotEye Lite is able to display several different series in each *study panel*, depending on the currently-set series tiling. Each one of these series will be displayed in a dedicated *series panel*. In turn,

each series panel can show one or more images of the associated series, depending on the *image tiling* set on the series panel itself (i.e., the number of image columns and image rows).



In case of series containing more than one image, the *series panel* will present a slider which user can utilize to quickly scroll through the images of the series regardless of the selected tool.

## 7.5 Thumbnails panel

The *Thumbnails* panel displays thumbnail images:



Thumbnails are grouped by study in a dedicated tab. A click on the X icon of the tab will remove entire study from RemotEye Lite.

Every thumbnail shown presents the series identification number, the DICOM series number, and the number of frames/images contained in that series.

In case of studies with cine-sequences, a special icon will be also present and every thumbnail will be associated to a viewing series/sequence.

Every tile drew on this panel is a series loaded in RemotEye Lite and, if a tile is long-pressed (double click for desktop clients), the selected *Image panel* will load the entire series related to the thumbnail.

In addition to this loading method, on desktop clients is also possible to drag one thumbnail and drop it onto one image panel in order to load and display the series related to the thumbnail just dragged.

When RemotEye Lite is displayed by desktop or tablets devices, the *thumbnails panel* is always visible and placed to the left side of the screen.

Smartphone users, instead, can access the *thumbnail panel* by touching the  icon that will be shown in the *Main toolbar*. On such action, the *thumbnails panel* is then placed in a popup container displayed above the selected image panel.

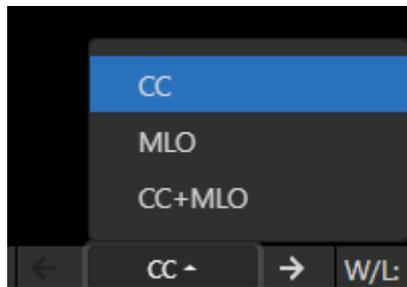
## 7.6 Status panel

The *status panel* is the bottom portion of the GUI of RemotEye Lite:



This panel contains the following items:

- Hanging step switcher: the dropdown menu displays the hanging step currently in use, which depends on the selected *study panel*. Users can quickly switch to the previous and next hanging step thanks to the provided arrow buttons. By clicking the drop-down itself, the list of available hanging steps belonging to the current hanging protocol will be displayed:

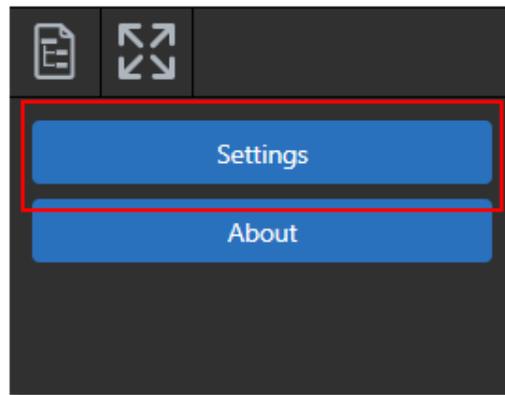


By clicking on an hanging step, the viewer will reconfigure itself following the hanging step definition.

- Window / Level presets switcher: the dropdown menu allows for a quick selection of a Window / Level preset from the list of presets matching the currently selected image. The special *Reset* drop-down item can be used to reset the window level to its original value.
- Loading progress: a progress bar the viewer shows when a long operation is running.

## 8 Settings

As detailed in paragraph 6.2.1.3 users can access the RemotEye Lite settings via the *Overflow panel* by utilizing the highlighted button below:

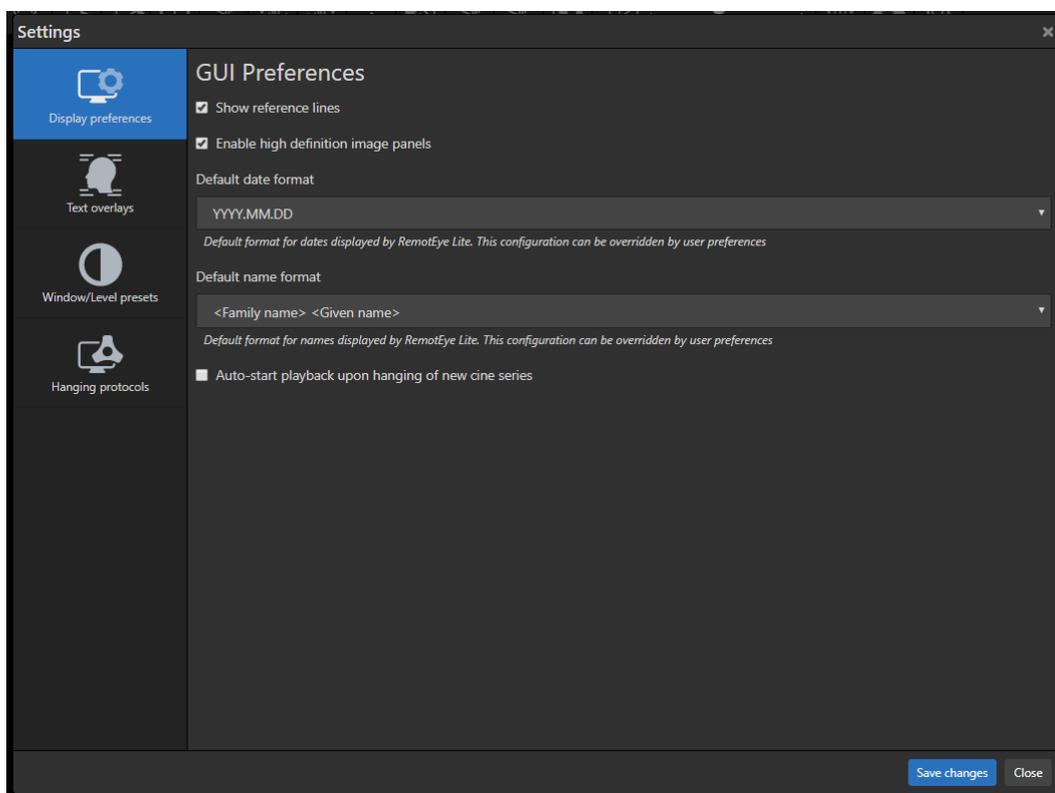


Access to the button and to the *Settings* section might be denied depending on the configuration of the backend.

The dialog that is displayed when the *Settings* button is clicked is made of different section, each one described in the next paragraphs.

## 8.1 Display preferences

The *Display preferences* section of the *Settings* dialog contains several preferences that changes the behavior of the RemotEye Lite interface.

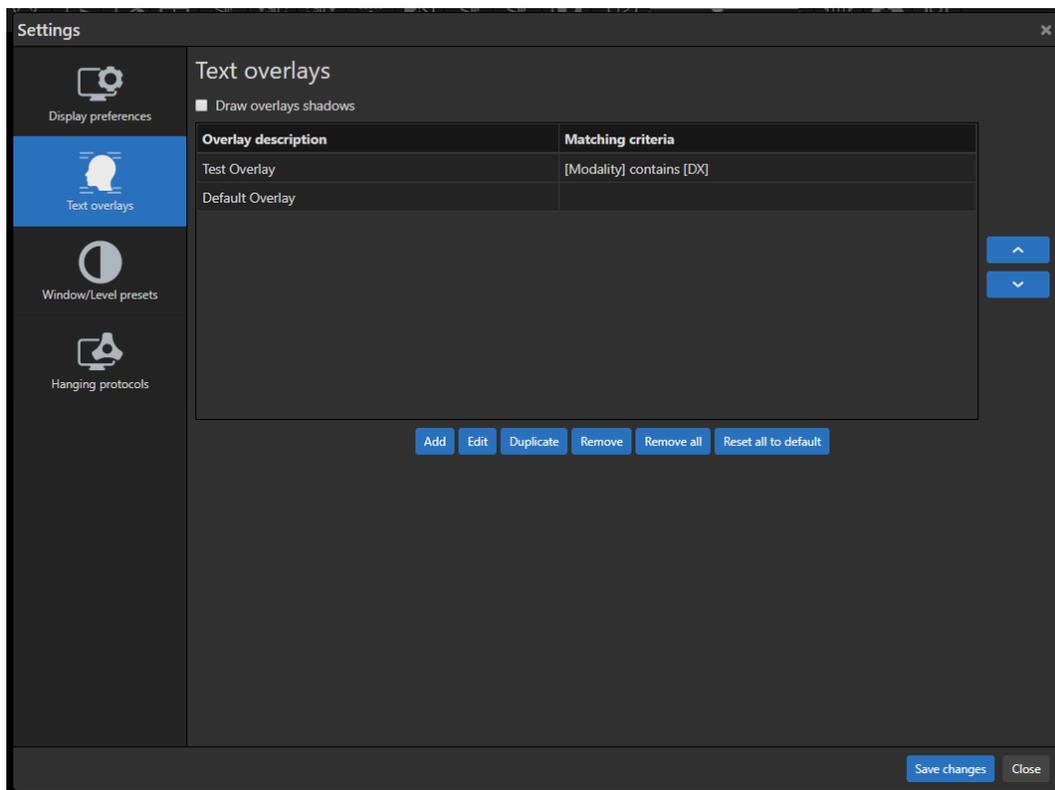


A list of the available preferences is listed below:

- *Show reference lines*: enables or disables reference lines (also known as “scout lines”) on CT or MR images.
- *Enable high-definition image panels*: enables or disables usage of high-definition image panels. This preference is useful on HiDPI devices in order to take fully advantage of the full resolution of the device.
- *Default date format*: defines the date format for dates displayed by RemotEye Lite, i.e.: Study date.
- *Default name format*: defines the format of names displayed by RemotEy, i.e.: Patient’s name.
- *Auto-start playback upon hanging of new cine series*: when enabled, RemotEye Lite will automatically start playing ‘cine’ series.

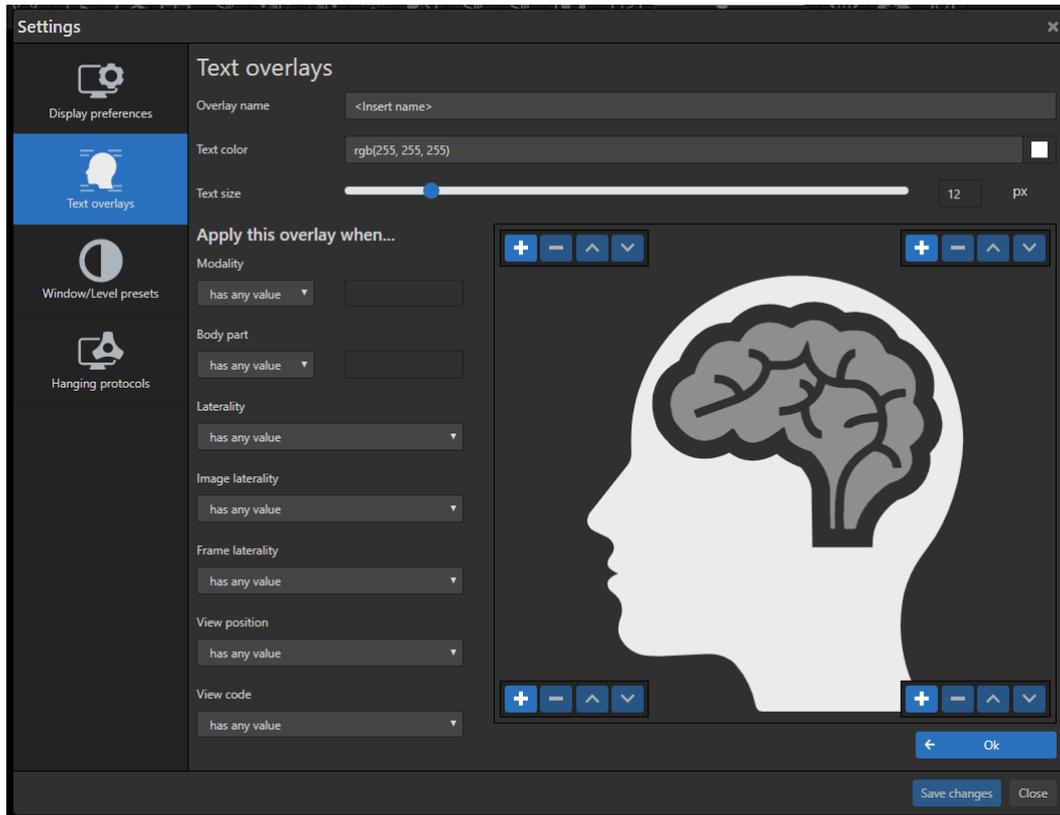
## 8.2 Text overlays

RemotEye Lite allows displaying textual overlays on the medical images. Moreover, the information included in the text overlays is completely configurable. By accessing the *Text overlays* section of the *Settings* dialog, the following content will be displayed:



This page shows a list of all textual overlays which are currently configured in RemotEye Lite. Each overlay is identified by a description and a set of matching criteria. For example, text overlays related to MR modality

are displayed only on MR images. As detailed in the following, different parameters are settable in order to define proper matching criteria to be used for each text overlay. In addition, selecting the *Draw overlays shadow* checkbox, high-quality, high-contrast, anti-aliased rendering of the text strings related to overlays will be enabled. In order to create a new textual overlay, user has to click on the *Add* button, and the following dialog box will appear:



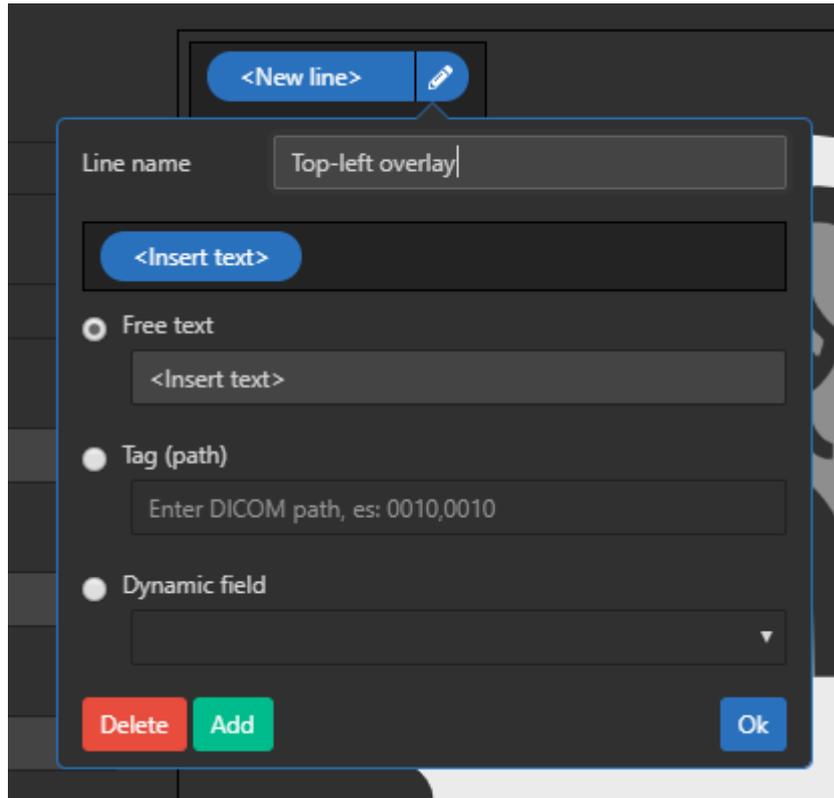
From here, user can insert a description of the textual overlay that is going to be created, as well as choose the related matching criteria, the color and size of the text (i.e., the color and the size in which the text will be painted over the images).

Regarding the definition of the matching criteria, many DICOM attributes are supported: the *Modality* and the *Body part examined* fields support several matching modes, also including regular expressions.

*Laterality*, *Image laterality*, *Frame laterality*, *View position* and *View code* are other fields whose value can be chosen from a predetermined list.

Using the appropriate overlay areas placed at the corners of the image panel prototype, user can decide which information to display, and where to show it.

Clicking on the + button located in each corner, a new overlay text line will be added in that corner of the image, and the following dialog will appear:



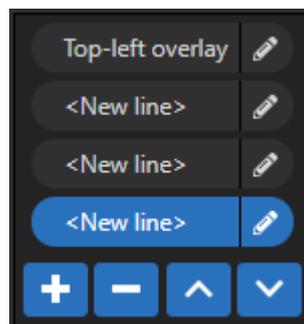
From here, it is possible to choose which overlay field to insert in the specific text line. User can give a description of the overlay line using the appropriate *Line name* field.

By clicking on the *Add* button, users can add a new field to the current overlay text line. Once the field is selected with a mouse click, user can choose the type of overlay field.

Selecting the *Free text* option, user can insert a fixed free text in the appropriate space. Clicking on the *Tag (path)* option, user can choose a specific DICOM attribute to display (e.g., DICOM: 0010,0010 - Patient's Name). While, selecting the *Dynamic field* option, a drop-down menu will appear, allowing user to choose the desired dynamic field (e.g., zoom factor) from a pre-defined list.

Through the *Delete* button it is possible to delete the currently-selected overlay field.

In the same way, the - buttons located in the overlay areas at the corners of the panel, allow to remove the currently-selected overlay line.





**Warning:** RemotEye Lite supports an *Image sizes warning* text field, appearing when calibrations which could affect the meaning of measurements have taken place on the image being displayed. If this field is not included in an overlay, or if it is present but part of a hideable line, this may result in a safety risk.

For all overlays, it is recommended to include this overlay text field in a non-hideable overlay text line.

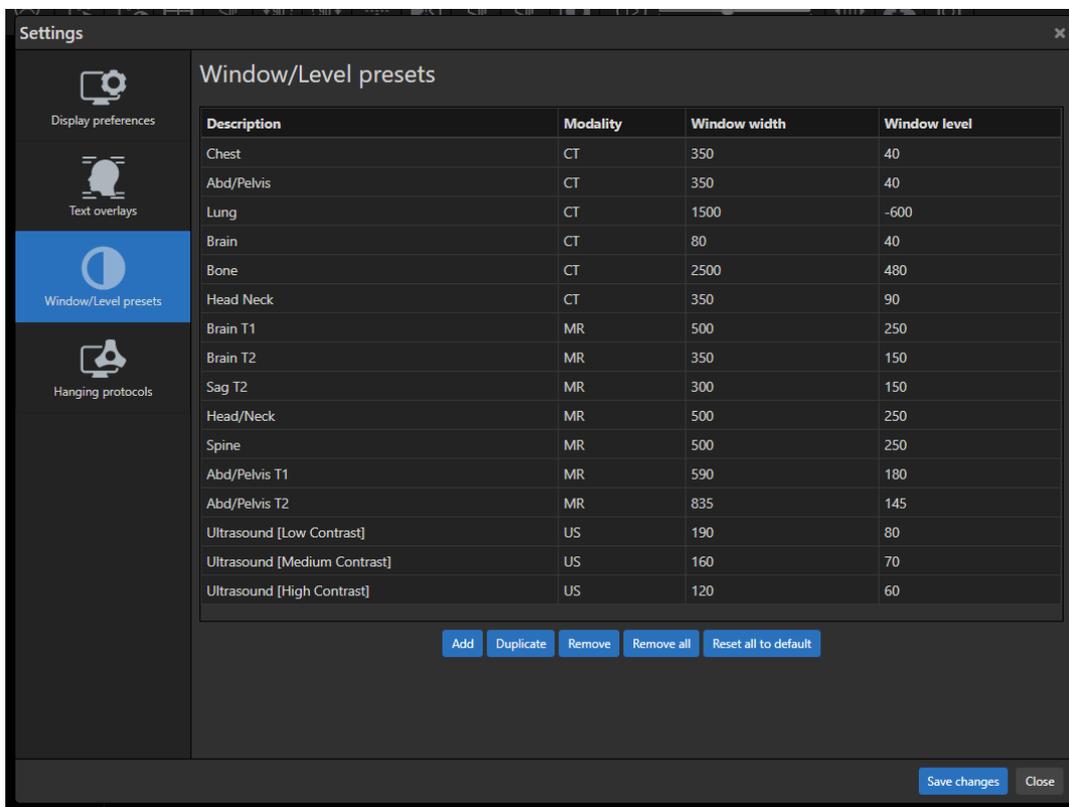


**Warning:** RemotEye Viewer supports an *Image lossy warning* text field, appearing when an image encoded with a lossy compression algorithm is displayed. If this field is not included in an overlay, or if it is present but part of a hideable line, this may result in a safety risk.

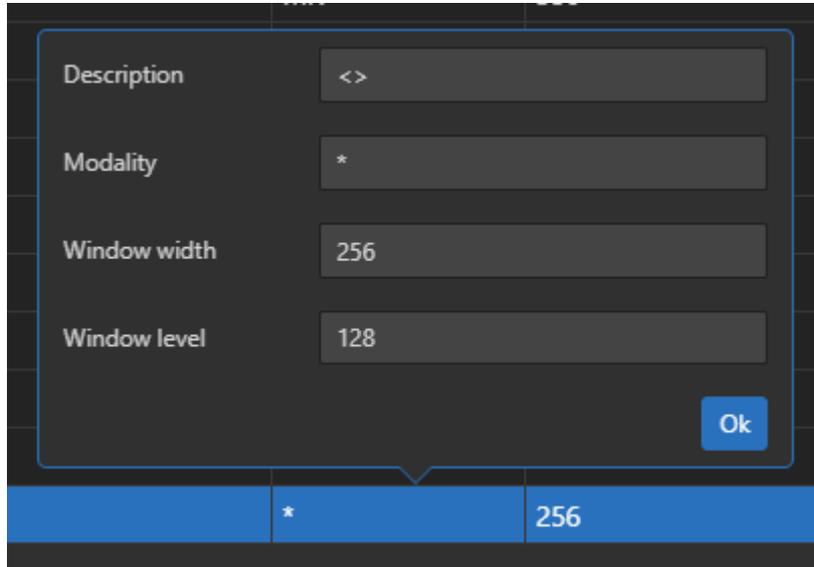
For all overlays, it is recommended to include this overlay text field in a non-hideable overlay text line.

### 8.3 Window / Level presets

RemotEye Lite supports definition of contrast presets through the GUI. The *Window/Level presets* page, showing the contrast presets currently defined for the present user, can be displayed by selecting the *Window/Level presets* item from *Settings* dialog.



In order to create a new contrast preset, press the *Add preset* button, located at the bottom of the *Window/Level presets* configuration page. A new *Window/Level Preset* dialog box will appear, as show in the picture below.

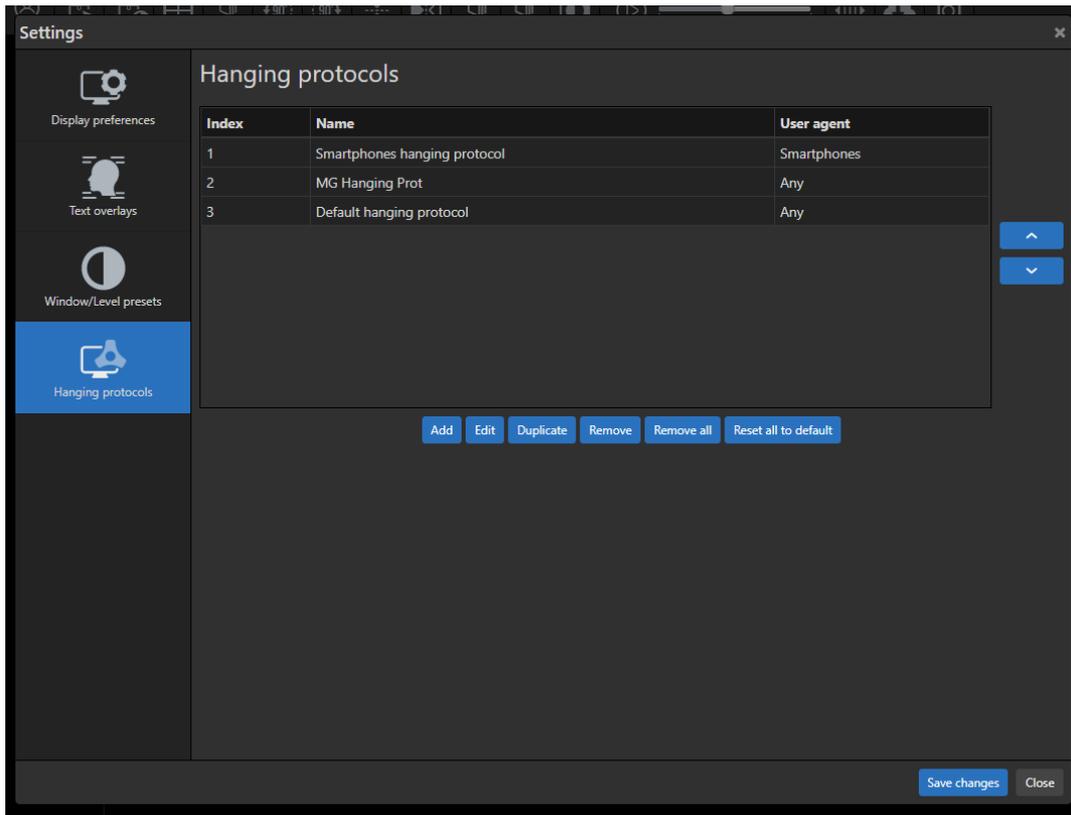


This dialog allows specifying the *Description* (i.e., identifying name appearing on the GUI) for this *Window/Level Preset*, as well as the *Modality*, *Window Width* and *Window Level* data. If you select a specific *Modality* when building the preset, then this *Window/Level* preset will only be available when images of that modality are selected.

## 8.4 Hanging protocols

RemotEye Lite supports *hanging protocols*. Hanging protocols allow defining and automating the way studies are displayed on screen, in terms of display layout as well as in terms of rules which specify which images must be hung to which image panels on the GUI.

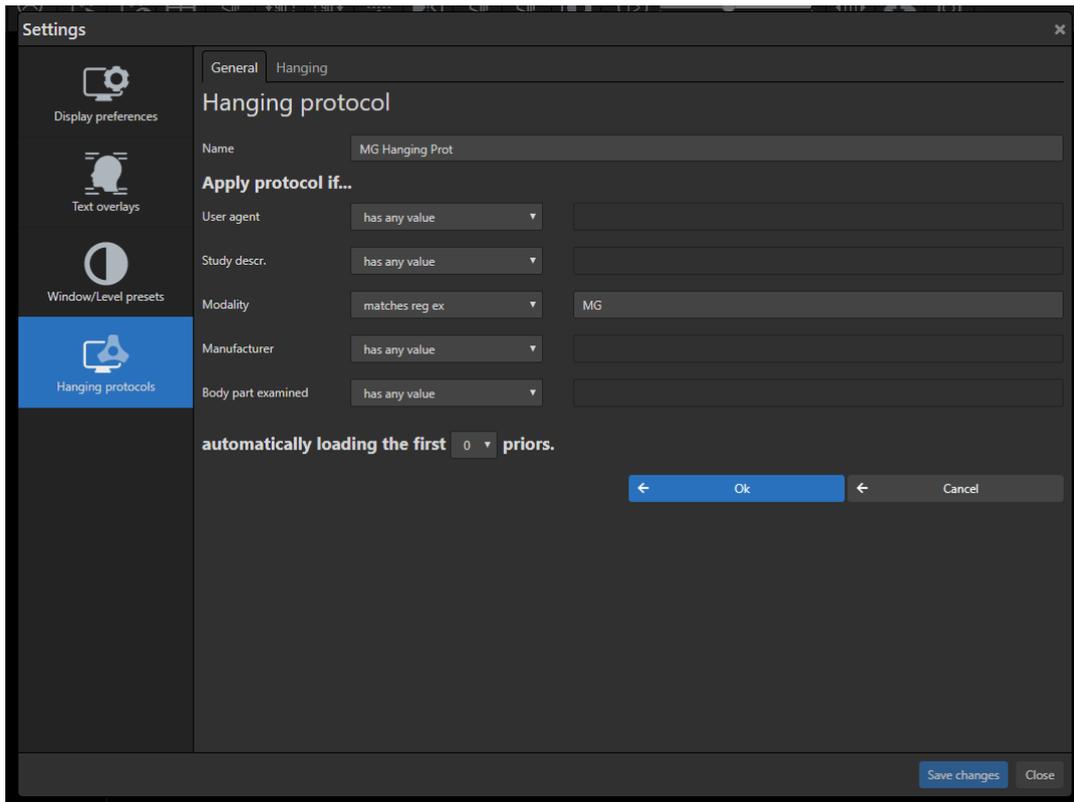
The *Hanging protocols* page can be displayed by selecting the *Hanging protocols* item in the left-hand list of the *Settings* dialog.



This window shows all hanging protocols currently defined for the present user. Each hanging protocol is identified by a *protocol name*, which shall be unique.

When a study is loaded, for instance by clicking the *Load* button on a study node in the *Patients/Studies* window, a check on all available hanging protocols is made. The first matching hanging protocol (if any) will be automatically applied upon loading of the study. The user will then be able to apply other hanging views of other matching hanging protocols once the study will be displayed on screen.

In order to create a new hanging protocol, press the *Add protocol* button, located at the bottom of the *Hanging protocols* configuration page. A new *Hanging Protocol* dialog box will appear, containing different tabs, as show in the picture below



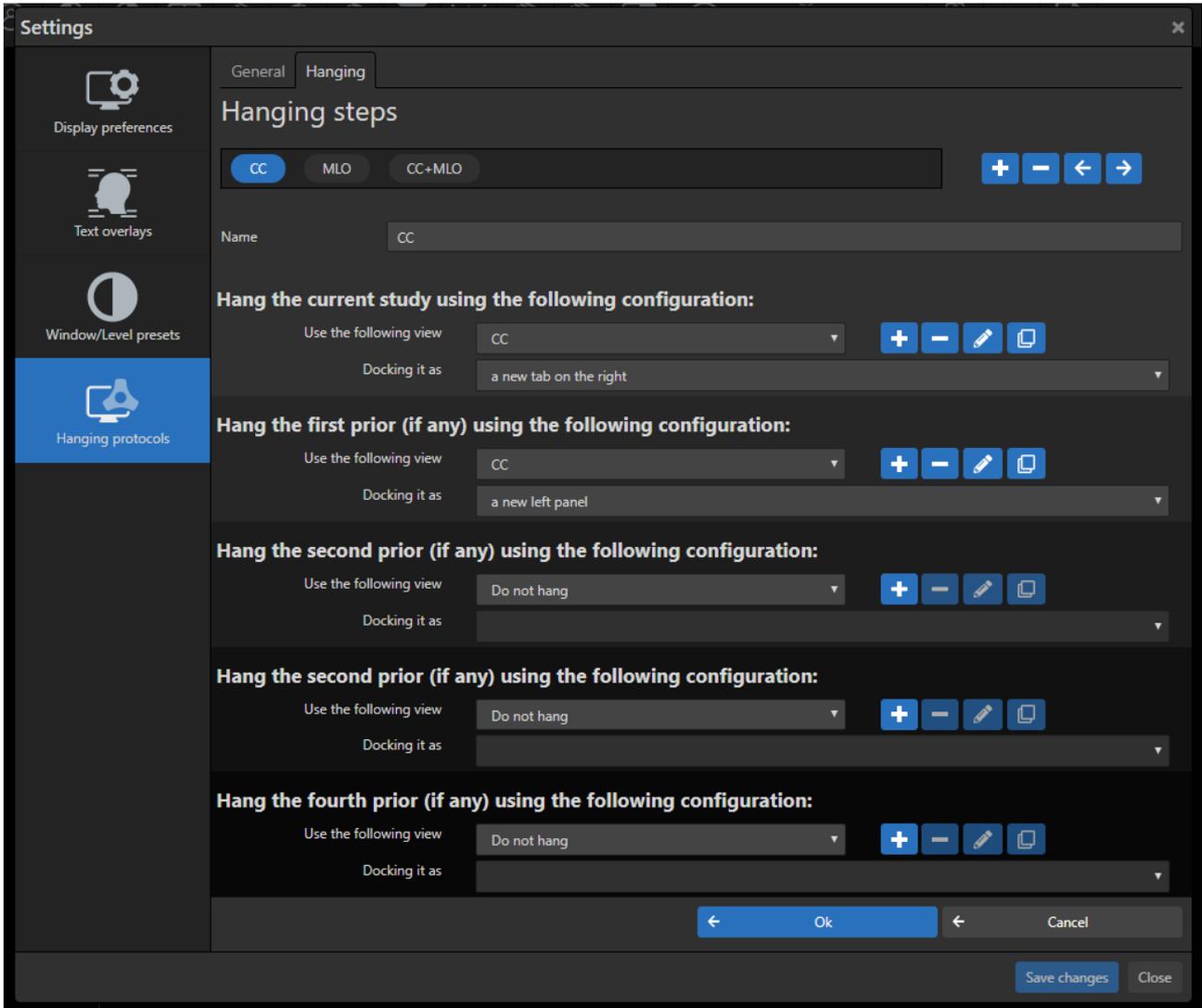
The first tab (*General*) allows specifying the *Protocol name* for the new Hanging Protocol. In addition, you need to specify which kind of studies this Hanging Protocol will apply to; in particular, the *Study Description*, the *Modality*, the *Manufacturer* and the *Body part examined* DICOM attributes are available as matching criteria. User can also specify the *User agent* of the browser in order to treat smartphones or tablets differently from desktop devices.

All these attributes can also be matched as result of a regular expression.

At the bottom of the *General tab*, it is possible to specify the number of prior studies which RemotEye Lite will try to load automatically when the hanging protocol is being applied.

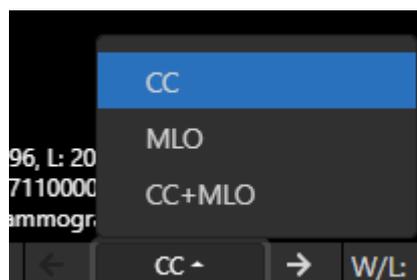
The first prior study is the most recent study, prior to the selected one, matching the criteria of the current hanging protocol. In the same way, the second, the third and the fourth prior studies are the second, the third and the fourth most recent studies, prior to the selected one, matching the criteria of the current hanging protocol. The *Prior studies* options are particularly useful when one wishes to automate comparisons of exams taken by a given patient over time.

Clicking on the *Hanging* tab, the following page will be open:



From here, user can specify the hanging preferences which will be associated with this hanging protocol, hence will be applied upon loading a study which matches this hanging protocol.

The *Hanging* section of the hanging protocol configuration interface allows defining exactly how studies and series shall be presented on screen upon study load. Moreover, this section allows defining several "*hanging steps*" within each hanging protocol. While viewing a study, it will be possible for the user to easily iterate through all "*hanging steps*" which are present within the hanging protocol, in a next/previous fashion, as shown in the following image:



In order to define a new hanging step, user has to press the  button next to the Hanging steps area.

Similarly, it is possible to remove an existing hanging step using the  button. The  and  button can be used to move the *hanging step*, prioritizing or de-prioritizing its application.

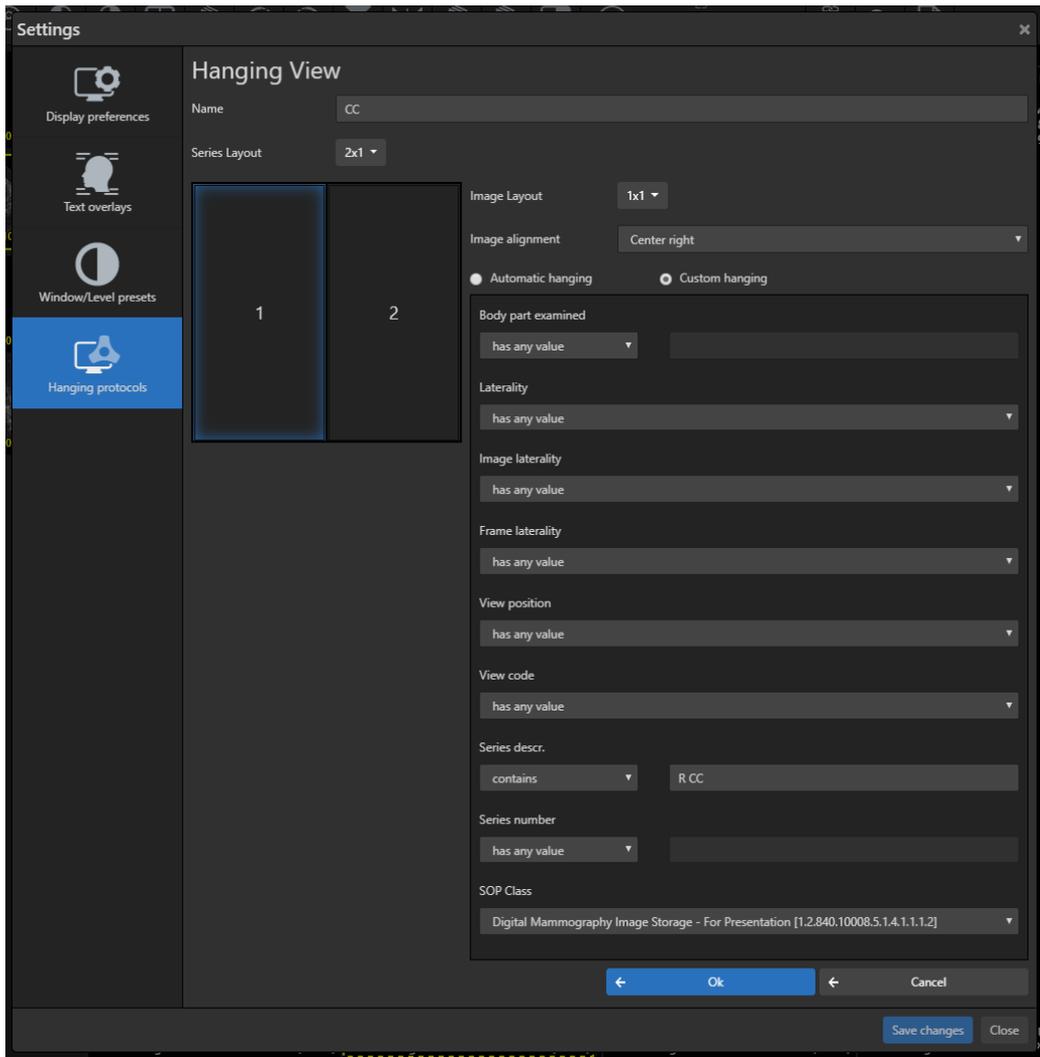
Selection of hanging preferences are specified separately for each study (current and/or priors) within every hanging step. The set of hanging preferences for each screen is known as a *hanging view*. Hence, the user shall define and/or select a hanging view for each hanging step, to adopt for each study. It is possible to

define a new hanging view by pressing the  button next to the hanging view selection drop-down box. In

addition, the  button allows duplicating a selected hanging view. Furthermore, it is possible to delete an

existing hanging view by pressing the  button. Finally, pressing the  button the user can edit the currently-selected hanging view.

When creation or edit of a hanging view is triggered, the *Hanging view* dialog box will appear, as shown in the following picture.



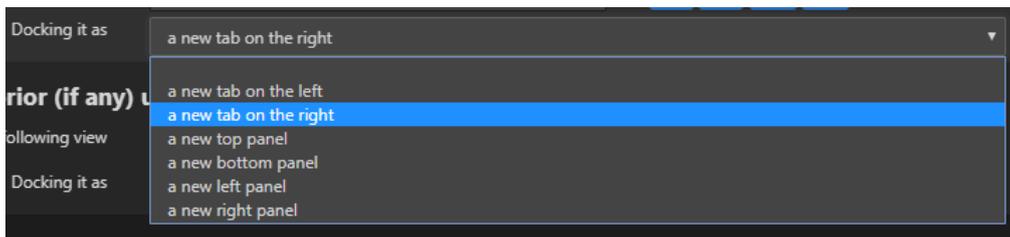
A description of each parameter of the hanging view follows:

- *Name*: the unique identifying name of the hanging view.
- *Series tiling*: the series tiling (i.e., series columns and series rows) to apply on the study panel where the study will be hung.
- *Image tiling*: it allows specifying the image tiling for each series panel. The image tiling determines how many images of that series will be concurrently visible in a specific series panel.
- *Image alignment*.
- *Automatic hanging*: series will be hung automatically by the software in the target study panel.
- *Custom hanging*: the user is able to specify hanging rules for each panel of the chosen display layout: upon study load, the series which first matches the hanging rule for a given series panel will be displayed in that series panel. By selecting the *Custom hanging* option, following tab will be activated:

- *Standard attributes*: the main and most-commonly used DICOM attributes for a hanging rule can be set in this tab. Here are the supported standard attributes:
  - *Body Part Examined*
  - *Laterality*
  - *Image Laterality*
  - *View Position*
  - *View Code*
  - *Series Description*
  - *Series Number*
  - *SOP Class*

Where appropriate, the matching value for the DICOM attribute can be specified in terms of regular expression (*Body part examined*, *Series description* and *Series number* attributes).

After the definition of the hanging view(s), the user can define exactly “where” the study panel (laid out according to the hanging view) shall be located within the screen, by acting on the docking properties:



## 9 Custom Toolbar buttons

In addition to the already available buttons described in the previous paragraph, integrators can add custom buttons to the main toolbar by editing the file:

```
C:\ProgramData\NeoLogica\RemotEyeLite\CustomCode\CustomCode.js
```

```
/opt/NeoLogica/RemotEyeLite/CustomCode/CustomCode.js
```

The provided file contains a commented example of how a developer can add custom toolbar buttons. The location of that won't be overwritten in case of upgrade.

## 10 RemotEye Lite integrations

RemotEye Lite now offers a useful script which can be used by developers and system integrators in order to display DICOM images using RemotEye Lite from a third-party application. This script is called **DisplayStudy.html** and can be accessed from the following URL:

<http://<yourserver>:<yourport>/viewer/DisplayStudy.html>

The behaviour of this script changes in relation to the parameter passed against its URL.

A list of all the available parameters follows:

- **rows**: defines the number of **Image panels** rows that will be displayed.
- **columns**: defines the number of **Image panels** columns that will be displayed.
- **studyUIDsList**: a list of one or more study instance uids separated by the '\' character, that RemotEye Lite will try to display.
- **patientIDsList**: a list of one or more patient IDs separated by the '\' character that RemotEye Lite will try to display.
- **accNumsList**: a list of one or more accession numbers separated by the '\' character that RemotEye Lite will try to display.
- **initialTreeURL**: if this parameter is present then RemotEye Lite will use this URL in order to build the list of study to display
- **pushURL**: if this parameter is present then RemotEye Lite server will use this URL in order to download the list of images to send back to the client. The content of this pushURL **must be** a simple text document containing a list of URLs separated by the '\n' character. Every URL in this list must be a valid DICOM file which will be sent to the client.
- **username**: the username which is trying to obtain access to RemotEye Lite. This parameter is useful only if the **Authentication URL** is set in the RemotEye Lite server configuration.
- **password**: the password of the username which is trying to obtain access to RemotEye Lite. This parameter is useful only if the **Authentication URL** is set in the RemotEye Lite server configuration.
- **windowWidth**: the width of the window/level combination that will be used for all the loaded images
- **windowLevel**: the level of the window/level combination that will be used for all the loaded images
- **callingAETitle**: if supported by the backend, this is the Calling AE Title RemotEye Lite server will use during its requests
- **calledAETitle**: if supported by the backend, this is the Called AE Title RemotEye Lite server will use during its requests
- **imgGenRule**: if this parameter is present and valid then RemotEye Lite will use the information to override any Image Generation Rule that would have matched. This parameter can be used to require a specific image quality directly from the URL.

The parameter must be the following JSON, correctly URL-encoded:

```
{
  "subsamplingThreshold": int_value,
  "jpegPassThroughEnabled": true/false,
  "jpegOutputQuality": 0/100
}
```

In addition to the just described parameters, RemotEye Lite also supports base64encoded parameters' values. Please use the following table, which describes the name of the base64encoded parameters.

Parameter Name	Base64 encoded name
username	p1
password	p2
authenticationToken	p3
patientIDsList	p4
studyUIDsList	p5
accNumsList	p6
initialTreeURL	p7
pushURL	p8
callingAETitle	p9
calledAETitle	p10

Examples:

1. Load the study having study instance uid = '1.2.3.4.5.603' in a 2x2 layout (default view).

<http://<yourserver>:<yourport>/viewer/DisplayStudy.html?studyUIDsList=1.2.3.4.5.603>

2. Load the patient having patient ID = 'patient1' in a 3x2 layout.

<http://<yourserver>:<yourport>/viewer/DisplayStudy.html?rows=3&columns=2&patientIDsList=patient1>

3. Load the study having accession number = 'accnum01' in a 3x3 layout using this login information:

Username: admin

Password: admin

<http://<yourserver>:<yourport>/viewer/DisplayStudy.html?rows=3&columns=3&accNumsList=accnum01&username=admin&password=admin>

4. Load the studies specified by the following initial tree url:

<http://localhost:8080/Test/BuildInitialTree.php?study=study1>

<http://<yourserver>:<yourport>/viewer/DisplayStudy.html?initialTreeURL=http%3A%2F%2Flocalhost%3A8080%2FTest%2FBuildInitialTree.php%3Fstudy%3Dstudy1>

**Important note:** always remember to perform a URL encoding of the parameter passed to this script.

5. Load all the images specified by the following URL:

<http://localhost:8080/Test/pushURL.php>

**The pushURL script must contain a list of URLs pointing to the actual DICOM files, separated by the '\n' character (newline).**

<http://<yourserver>:<yourport>/viewer/DisplayStudy.html?pushURL=http%3A%2F%2Flocalhost%3A8080%2FTest%2FpushURL.php>

## 11 RemotEye Lite integration with PACSConnector

As stated in paragraph 2, RemotEye Lite uses an already existing integration between RemotEye and a backend in order to work. In the light of this statement it stands obvious that RemotEye Lite can use the PACSConnector module integration in order to display images stored in any DICOM-compliant PACS server.

The configuration is really straightforward, the only information needed is the installation location of PACSConnector (in this guide assumed as <http://<PACSConnectorHost>:<PACSConnectorPort>>).

Once this information is known RemotEye Lite server needs to be configured as follows:

Query Studies URL:	<a href="http://&lt;PACSCConnectorHost&gt;:&lt;PACSCConnectorPort&gt;/PACSCConnector/REScripts/QueryStudies.php?reLite=true">http://&lt;PACSCConnectorHost&gt;:&lt;PACSCConnectorPort&gt;/PACSCConnector/REScripts/QueryStudies.php?reLite=true</a>
Query Series URL:	<a href="http://&lt;PACSCConnectorHost&gt;:&lt;PACSCConnectorPort&gt;/PACSCConnector/REScripts/QuerySeries.php?reLite=true">http://&lt;PACSCConnectorHost&gt;:&lt;PACSCConnectorPort&gt;/PACSCConnector/REScripts/QuerySeries.php?reLite=true</a>
Query Instances URL:	<a href="http://&lt;PACSCConnectorHost&gt;:&lt;PACSCConnectorPort&gt;/PACSCConnector/REScripts/QueryInstances.php?reLite=true">http://&lt;PACSCConnectorHost&gt;:&lt;PACSCConnectorPort&gt;/PACSCConnector/REScripts/QueryInstances.php?reLite=true</a>
Retrieve Instance URL	<p><b>If RemotEye Lite and PACSCConnector are installed on different servers:</b></p> <p><a href="http://&lt;PACSCConnectorHost&gt;:&lt;PACSCConnectorPort&gt;/PACSCConnector/REScripts/RetrieveInstance.php?reLite=true">http://&lt;PACSCConnectorHost&gt;:&lt;PACSCConnectorPort&gt;/PACSCConnector/REScripts/RetrieveInstance.php?reLite=true</a></p> <p><b>If RemotEye Lite and PACSCConnector are installed on the same server:</b></p> <p><a href="http://&lt;PACSCConnectorHost&gt;:&lt;PACSCConnectorPort&gt;/PACSCConnector/REScripts/RetrieveInstance.php?returnLocalFilePath=true&amp;reLite=true">http://&lt;PACSCConnectorHost&gt;:&lt;PACSCConnectorPort&gt;/PACSCConnector/REScripts/RetrieveInstance.php?returnLocalFilePath=true&amp;reLite=true</a></p>
Authentication URL:	<a href="http://&lt;PACSCConnectorHost&gt;:&lt;PACSCConnectorPort&gt;/PACSCConnector/REScripts/Authenticate.php?reLite=true">http://&lt;PACSCConnectorHost&gt;:&lt;PACSCConnectorPort&gt;/PACSCConnector/REScripts/Authenticate.php?reLite=true</a>
Query AE Titles URL:	<a href="http://&lt;PACSCConnectorHost&gt;:&lt;PACSCConnectorPort&gt;/PACSCConnector/REScripts/QueryAETitles.php?reLite=true">http://&lt;PACSCConnectorHost&gt;:&lt;PACSCConnectorPort&gt;/PACSCConnector/REScripts/QueryAETitles.php?reLite=true</a>
Client Will Load Instances URL:	<a href="http://&lt;PACSCConnectorHost&gt;:&lt;PACSCConnectorPort&gt;/PACSCConnector/REScripts/NotifyClientWillLoadInstances.php?reLite=true">http://&lt;PACSCConnectorHost&gt;:&lt;PACSCConnectorPort&gt;/PACSCConnector/REScripts/NotifyClientWillLoadInstances.php?reLite=true</a>
Periodic URL calls:	<a href="http://127.0.0.1/PACSCConnector/REScripts/KeepSessionAlive.php?reLite=true&amp;AuthenticationToken= _AUTHTOKEN_ &amp;CliSessID= _CLISESSID_">http://127.0.0.1/PACSCConnector/REScripts/KeepSessionAlive.php?reLite=true&amp;AuthenticationToken= _AUTHTOKEN_ &amp;CliSessID= _CLISESSID_</a>

## 12 How to report issues

In case you encounter issues or you detect a malfunctioning while using the software, please report the problem to the NeoLogica Support Staff.

NeoLogica uses a ticket-based online support system. In order to report a problem, please browse to the following web address:

<https://www.neologica.it/Support>

You will then be able to open a new "support ticket", and specify the details of the issue you have detected. The NeoLogica Support Staff will analyze the reported issue and will reply promptly, then making every effort to solve the issue in the shortest possible time.

## 13 Acknowledgements

RemotEye Lite makes use of the jQuery and jQuery Mobile frameworks.