

RTmedes[®] 1.4

User guide

INTENTIONALLY BLANK

Welcome

Dear customer! This user guide introduces you to RTmedes, a software which helps you get the overview of your DICOM RT data collection. If you miss any information, please have a look at our web page (www.rtmedes.com), where we have collected the answers to frequently asked questions. If you need further assistance, do not hesitate to contact us.

Contact

TatraMed Software

s.r.o.

Address:	Líščie údolie 9 841 04 Bratislava Slovak Republic, EU
Tel:	+421 2 6020 2300
E-mail:	rtmedes@rtmedes.com
Web:	www.rtmedes.com

Intended use

RTmedes is a computer software system providing *overview of DICOM radiotherapy data collection and graphical preview of radiotherapy plans for the purpose of data selection.*

Medical device

RTmedes is a class I medical device according to Medical Devices Directive 93/42/EEC. TatraMed Software s.r.o. is certified according to ISO 13485, Medical devices -- Quality management systems -- Requirements for regulatory purposes.



Symbols used in this guide


 **Caution:** Indicates that not paying attention to the instruction or explanation, or not complying with the instruction, may result in damage to the equipment or discomfort or injury to the operator or the patient.

Table of
contents

QUICK GUIDE - GALLERY	6
QUICK GUIDE - VIEWER	10
INSTALLATION	14
LICENSES	15
3 RD PARTY SOFTWARE	18


Quick guide - Gallery

Launching RTmedes

After the installation, RTmedes icon is placed on your desktop and in your Start menu. Use either of them to launch RTmedes.

Choosing folders




For RTmedes to show any data, you need to set up at least one folder containing RT data. To do that:

1. Select  *Settings* in the bottom toolbar. *Folder Setup* window appears.
2. Click *Add* button to add a new folder.
3. Browse to the desired folder.
4. You can add as many folders as you like. Each folder can be named symbolically, so that you can easily manage them later.
5. When done, click *Apply* button.

Locking folders

To prevent RTmedes from tracking changes, any of the pre-configured folders can be locked. This saves the resources (computing power, disk drive, network) when some folders do not change (archive folders, for example).

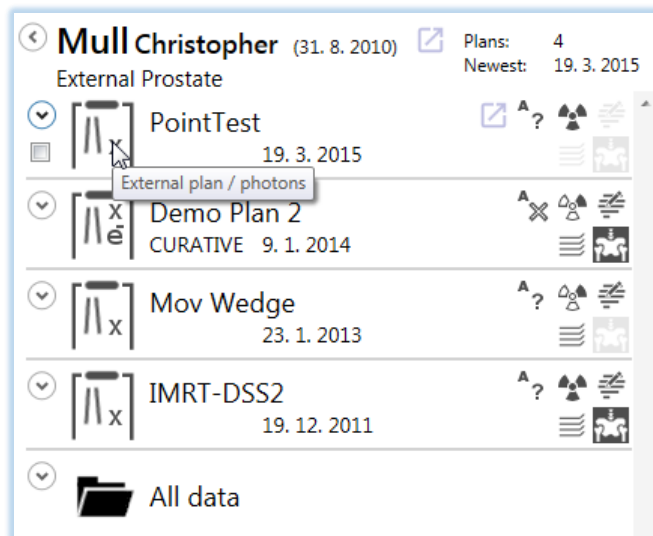
To lock or unlock folders:

1. Select  *Settings* in the bottom toolbar. *Folder Setup* window appears.
2. Click  or  next to the folder, which you wish to lock or unlock.
3. The icon indicates the new state; the actual state is not changed until you click *Apply*.


- To see more information about a folder's lock state, including time when the folder was locked, move the mouse over the locking icon. A tooltip will show more information.



Viewing plan information

When the system detects DICOM data, it provides plan-oriented information about the data.



The information is shown in a hierarchical manner organized into patient, plan and beam/application setup levels. The information is shown as a text or as an icon; in addition, tooltips are displayed over icons, providing more detailed explanation of the icon meaning.

- On patient level, patient's name, ID and date of birth are displayed. If plans are available for the patient, the total number of plans is shown, as well as the date of the newest plan. If no plans are available, the date of newest images or structure set is shown.
- Click  (arrow) next to the patient's name to display patient's plans. On plan level, plan name, plan intent and plan date are shown. The plan icon indicates the plan type; additional icons indicate the plan approval status, dose, structure set, planning images and RT images availability.

3. Click  (arrow) next to a plan to see more details – external radiotherapy plans display beam list; brachytherapy plans show application setup information.
4.  *All data* contains all image series and structure sets belonging to the patient.

Refreshing plan list

RTmedes is keeping track of any changes in the folders set up to be processed. If, for any reason, the list does not display the latest changes, you can refresh the list content. To do so:

1. Press **F5** to refresh the content of the plan list.
2. The list will be refreshed; all the pre-processed data will be re-read from the cache and the folders will be scanned for changes.

The cache of pre-processed data can become corrupted as well. In that case, all the pre-processed information can be discarded and all the data files can be processed again. To do so:

1. Press **Ctrl+Alt+F5** to discard the cached data and initialize re-loading.
2. RTmedes will start re-reading the content of the configured folders from the beginning, discarding all the pre-processed data.

Searching

While browsing the data:

1. Start typing any text.
2. The patient list is automatically filtered by patient's names and patient's IDs containing the text entered.
3. To cancel the filter, press **Esc** or click **×** (cross icon) in the *Search bar*.
4. Alternatively, you can also use *Search bar* to enter or modify the text.


Ordering the patient list


When you start RTmedes, the list is sorted by the newest plan date. Patients having the most recent plans are at the top of the list. To change the order:

1. Select the desired order using *Arrange by* selection in the top bar.
2. To toggle between ascending and descending order, re-select the same criteria in *Arrange by* selection.


Selecting data

The selection marks the data which you wish to export.

Use check boxes next to patient, plan or individual objects in  *All data*:

1. Toggle the check box next to a patient to select or unselect all the patient data available.
2. Toggle the check box next to a plan to select the plan.
3. Click  *Clear selection* in the top bar to unselect all available data.




Exporting data

1. Select the data you wish to export.
2. Click  *Export*.
3. Select a folder to which you wish to export the data.
4. The data is exported to the selected folder. For each patient, a separate subfolder is created using the patient's name and the export date and time.












Quick guide - Viewer

Previewing images and plans


A preview of a plan or an image series can be shown.



1. Find the plan or the image series under  *All data* which you would like to see. If a patient has only a single plan, the plan can be opened directly from the patient header.
2. Click  *Open* on the desired patient, plan or series.
3. An image viewing window appears, showing an image from the plan or series selected.
4. To finish working with the preview, click  *Close*.

There are multiple controls which you can use while previewing images, plans and doses:

1.  Scroll in the image series using the mouse wheel, or using the toolbar at the bottom of the image.
2. Click  Grayscale to activate/deactivate Window center and width tool. Then adjust the window center and window width by moving the mouse while holding the left mouse button.
3.   Adjust zoom using the mouse wheel while holding  key.
4.   Move the image around by pressing down  key and the left mouse button and moving the mouse around.
5.   Double click the left mouse button while holding  key to reset the view.


Previewing dose distribution

 **Caution:** If geometrical planes, at which the dose distribution is calculated, do not coincide with the image planes, the dose distribution calculated at the closest dose plane is shown. If the closest dose plane is further away than 3 mm (or, when outside of the dose volume, 0.1 mm), the dose is not displayed. Whenever dose is displayed, the distance between the image plane and the dose plane is shown as *Distance to dose* information in the view.

1. Click  *Dose* to toggle the dose display mode. Available modes are: off, isolines, isolines and isoshades, isoshades.
2. Click  *Live dose* to activate/deactivate live dose tool. Move the mouse over the image to see the dose information and isoline through the mouse point.

Defining isolines

To add a certain isoline level:


1. Click  *Add isoline* to enter a new value.
2. Enter the desired dose value in the current dose unit and press Enter (or click anywhere with the mouse).
3. The isoline of the newly entered value is shown in the view. The isoline is also shown in the isoline legend, which is visible whenever at least one isoline is defined.

The isoline legend always shows units, in which the dose is currently shown. For each isoline level, its color and value are displayed.

Please note that the defined isoline values are valid for the current plan only. When opening another plan, isoline values have to be entered again.

Removing isolines

To remove a previously defined isoline:


1. Place the mouse over the value you wish to remove
2. Click  next to the isoline value. The value is removed and no longer shown in the view.

Viewing ROIs




Caution: Only ROI contours which are geometrically very close to the slices of the image set are shown. Structure set may contain other contours, which are not displayed in RTmedes.

When there is an RT Structure set associated with the plan and ROIs are available:

1. Toggle  *ROIs* to turn the ROI display on or off.

Individual ROI handling

To manage individual ROIs:

1. Click  *Manage* to display the list of ROIs available in the RT Structure Set.
2. To highlight ROI's contours, place the mouse over any of the ROIs in the list, or over a contour directly.
3. In the ROI list, toggle the checkboxes next to the individual ROIs to change their visibilities.


Visibility by ROI type


The ROIs' visibility can be toggled on or off by their type:

1. To control the visibility of target or avoidance ROIs, use the *Targets* and *Avoidance* checkboxes at the top of the ROI list.
2. To quickly hide or show all ROIs, toggle *All* checkbox.


Note that the individual ROIs in the list are colored and grouped by their respective types.

Inspecting DVH

 **Caution:** DVH chart displays warning if the whole volume of at least one ROI is not fully covered by dose grid.

 **Caution:** Chart displays warning if DVH has not been calculated for every ROI covered by dose grid.

For any plan containing ROIs and dose, DVH can be displayed.

1. Click  *DVH* to display DVH.
2. Place mouse cursor over DVH of specific ROI in the chart and hold left mouse button to display absolute dose as well as relative and absolute volume covered by this dose.

Note: you can zoom and pan DVH exactly as you do with standard images.

Installation

Requirements

RTmedes can be installed and used on 64bit operating systems Windows™ 7, 8 or 10.

Web-based installation

The easiest way to install RTmedes is via the web-based installation. Please navigate to *Download* section of rtmedes.com web page, and select *Online installer*. When asked, allow the computer to install the software.

Installing RTmedes via web-based installer ensures that all the necessary prerequisites are installed if needed.

Additionally, if RTmedes is installed in this way, it checks for a newer version on web on later launches if your computer is online. If there is an updated version available, it offers to install the new version.

Manual installation

When it is not possible to install RTmedes in this way, you need to download the standalone install kit and perform the necessary prerequisite installations manually. This can be the case if your computer is offline or behind a proxy server which does not allow direct HTTP connections.

Please navigate to *Download* section of rtmedes.com web page, and select *Stand-alone installer*. You are then navigated to a page from which you can download the installation kit which can be deployed on any computer. Prerequisites needed by RTmedes can also be downloaded from the same page.

Licenses

Licensing model

RTmedes requires a valid license to run. When you purchase the license, we will send you an *Activation key*, which you have to enter in the *License* window.

You can obtain a trial key using our web page.

Managing the license

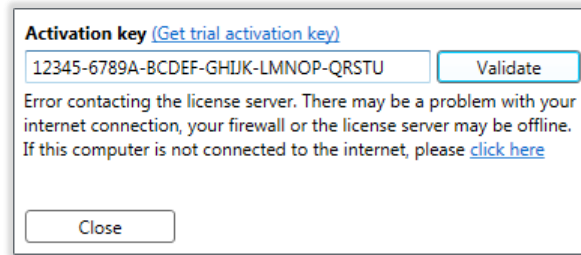
To use the *Activation key*:

1. When RTmedes is launched for the first time, it requests the activation key automatically.
2. Alternatively, click **?** (*About*) in the bottom bar; then click *License* in the information window.
3. Enter the *Activation key* you received.
4. Click *Validate*. RTmedes will check whether the license is valid; if the validation fails, the reason will be displayed in the *License* window.
5. Now you can use RTmedes for the period of your license validity.

Offline activation

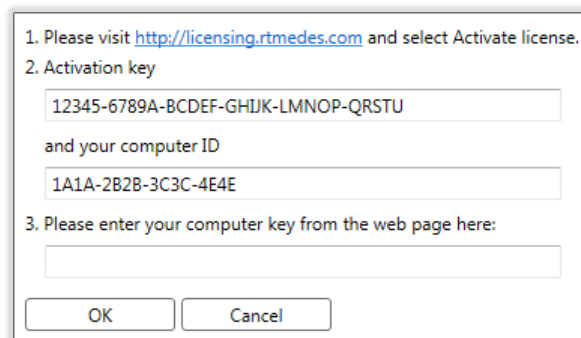
If the computer is not connected to the internet, is behind a proxy server, or there are other problems when contacting the license server, the system will not be able to validate the license automatically.

When this happens, RTmedes will provide an option to activate the license offline:



To activate the license offline:

1. Click on the *click here* link in the error message (see the picture above). This opens window with additional information which is needed for offline activation:



2. Visit licensing.rtmedes.com web page and select *Activate license*.
3. Enter the *Activation key* and *Computer ID* from the window in the picture above and select *Activate license*.
4. Copy the *Computer key* from the web page and enter it in the offline activation window in RTmedes.
5. Click *OK*.

License expiration

The *About* window always shows the validity period of your current license. At the end of the validity period, you may need to enter a new *Activation key* or to re-activate your current key.

The validity period shown may be shorter than the period for which the license is purchased. In such a case, re-validating the

license when the current validity expires is usually enough. If re-validation fails for any reason, please contact us.

3rd party software

RTmedes uses some 3rd party software libraries for its functionality. This is the list of the libraries and accompanying license information.

FO-DICOM v.3.0.2

Microsoft Public License (MS-PL)

This license governs use of the accompanying software. If you use the software, you accept this license. If you do not accept the license, do not use the software.

1. Definitions

The terms "reproduce," "reproduction," "derivative works," and "distribution" have the same meaning here as under U.S. copyright law.

A "contribution" is the original software, or any additions or changes to the software.

A "contributor" is any person that distributes its contribution under this license.

"Licensed patents" are a contributor's patent claims that read directly on its contribution.

2. Grant of Rights

(A) Copyright Grant- Subject to the terms of this license, including the license conditions and limitations in section 3, each contributor grants you a non-exclusive, worldwide, royalty-free copyright license to reproduce its contribution, prepare derivative works of its contribution, and distribute its contribution or any derivative works that you create.

(B) Patent Grant- Subject to the terms of this license, including the license conditions and limitations in section 3, each contributor grants you a non-exclusive, worldwide, royalty-free license under its licensed patents to make, have made, use, sell, offer for sale, import, and/or otherwise dispose of its contribution in the software or derivative works of the contribution in the software.

3. Conditions and Limitations

(A) No Trademark License- This license does not grant you rights to use any contributors' name, logo, or trademarks.

(B) If you bring a patent claim against any contributor over patents that you claim are infringed by the software, your patent license from such contributor to the software ends automatically.

(C) If you distribute any portion of the software, you must retain all copyright, patent, trademark, and attribution notices that are present in the software.

(D) If you distribute any portion of the software in source code form, you may do so only under this license by including a complete copy of this license with your distribution. If you distribute any portion of the software in compiled or object code form, you may only do so under a license that complies with this license.

(E) The software is licensed "as-is." You bear the risk of using it. The contributors give no express warranties, guarantees or conditions. You may have additional consumer rights under your local laws which this license cannot change. To the extent permitted under your local laws, the contributors exclude the implied warranties of merchantability, fitness for a particular purpose and non-infringement.

Math.NET Spatial v.0.3.0

Math.NET Numerics v.4.5.1

Copyright (c) 2002-2015 Math.NET

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Oxyplot

Copyright (c) 2014 OxyPlot contributors

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

NLog

Copyright (c) 2004-2018 Jaroslaw Kowalski <jaak@jkwowski.net>, Kim Christensen, Julian Verdurmen

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- * Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
- * Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
- * Neither the name of Jaroslaw Kowalski nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.