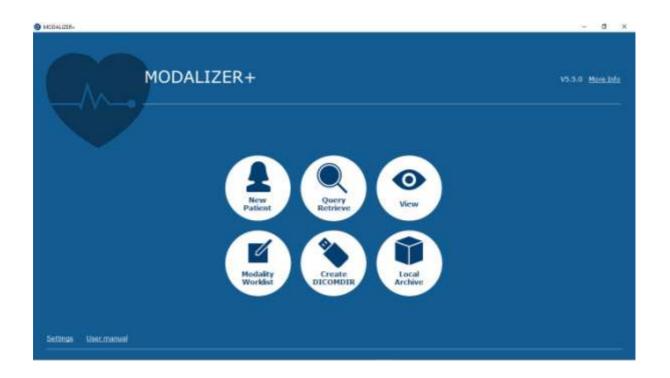
# **MODALIZER+**

User's Manual

# HEALTHCARE IMAGING WORKFLOW WIZARD



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# **Reference Documents**

Title	Date	Link	Comments
DICOM	Nov 13, 2019	http://downloads.roniza.com/MODALIZERP	
Conformance		LUS/MODALIZER+%205.5%20DICOM%2	
Statement		0CONFORMANCE%20STATEMENT.pdf	



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# 1. Introduction

MODALIZER+ is a powerful and easy-to-use Point-of-Care Imaging and Reporting tool. It was carefully designed to capture, scan and display Images and documents in PACS Environment. MODALIZER+ provides a complete solution for Healthcare personnel to document patient encounter and perform other related tasks. MODALIZER+ is a state of the art DICOM Application with rich feature set combining Imaging Modality, Reporting Tool, DICOM Viewer and Conversion Tool:

- Capture, scan and convert Images from image files, USB Cameras and TWAIN/WIA Imaging Devices, MPEG, PDF, JPG, PNG, TIFF and Bitmaps.
- Fully Customizable, auto-complete, PDF Report Template.
- Integrate with a PACS to store, search, retrieve and display Images and Reports.
- Workflow Integration using DICOM Modality Worklist and Modality Performed Procedure Step to obtain Patient and Procedure parameters, report procedure progress, and eliminate typos and QA.
- Multi-Modality Image Display and PACS Workstation creating, connecting, searching, retrieving and storing images and documents on the PACS Creating DICOM Media, Burning CD/DVD and USB with integrated DICOM CD Viewer.
- Manage your own medical image archive using the built-in Local Archive database.
- Built-in DICOM Listener
- Customizable DICOM instances structure and content.
- Configurable "Capture Key" to take images using the keyboard or dedicated hardware such as pedal or external capture button.

# System requirements

Computer: Microsoft Windows compatible laptop/desktop/tablet or virtual machine

**Display resolution:** minimum 940x640 pixels

**Operating systems:** Microsoft Windows 7, 8, 8.1 and 10

.NET Framework: 3.5

Processor: minimum recommended speed - 1Ghz

Internal memory: recommended minimum 1GB

Storage: recommended minimum 40GB of hard disk/SSD

**Network Protocol:** Secure DICOM Networking (TLS) over TCP/IP

**USB:** optional for external imaging hardware supporting VIA TWAIN/WIA: optional for paper scanner integration. Use the scanner vendor TWAIN driver utility for configuration of the scanning profile parameters.



#### **1.1. Why convert to DICOM?**

Digital Imaging and Communications in Medicine (DICOM) is the standard for handling, storing, printing, and transmitting medical images. DICOM is the most widely deployed healthcare-imaging standard in the world. DICOM images can be exchanged between two entities that are capable of receiving image and patient data in DICOM format.

DICOM enables the integration of scanners, archives, workstations, printers, and network hardware from multiple manufacturers into a picture archive and communication system (PACS).

### 1.2. Supported Image and Document Types

MODALIZER+ supports the following conversions: PDF, JPEG, PNG, BMP, TIF, MPEG-2, MPEG-4. MODALIZER+ can convert series of images of the same type and size to Multi-Frame DICOM objects stored in a single file.

# **1.3.** Free DICOM viewer

Now MODALIZER+ can be used as a free DICOM Viewer (no need of getting evaluation license to open DICOM files). Click "Free Viewer" or drag-drop DICOM file/folder onto application surface to open viewer screen.

Free viewer doesn't include converter and option to save measurements in GSPS module.



On exiting "free viewer" HRZ's website will be opened in default Internet browser.



# 2. Quick Start

This section is a quick step by step demonstration of MODALIZER+ Capabilities.

**NOTE 1:** You can open user manual in the external PDF viewer from any screen of the application:

(X) Cancel	💥 <u>Settings</u>	User manual	🕞 Back	() Next
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**NOTE 2:** There is an option to start MODALIZER+ from command line with some specified parameters. See detailed description in Appendix A.

### 2.1. The New Patient Wizard

- Click "New Patient" in the main menu.
- Enter the patient's data. Click the ellipses to the right of the patient last name text box to add middle initial, prefix and suffix. Click "Next".
- MODALIZER+ recognizes TWAIN/WIA Imaging Devices connected to your computer. You can select one of them using the drop-down menu on the top left corner of the image preview panel.
- Select files from your computer by clicking "Add files". If the camera preview panel is visible, capture images by clicking the red button or <u>capture key</u> (if configured). You can also drag-and-drop files from your computer to the MODALIZER+ window. Click "Next".
- Select "Convert" for Action and then click "Next".
- Click "Open destination folder". The case folder where the converted file are stored will open.
- Click the "Done" button to return to the main menu. For more details see <u>New Patient.</u>

# 2.2. Capturing Images and Scanning Documents

Video capture directly from MODALIZER+ is available on supported operating system. The video encoder is part of the standard windows 7 operating system but not available by default on windows 8 and later.

MODALIZER+ Automatically detects and connects to TWAIN/WIA supporting devices such as the internal web camera of your laptop, USB cameras and most document Scanners. When a supported imaging device is detected, the capture and preview panels are automatically displayed. MODALIZER+ allows you to work with multiple imaging devices simultaneously and easily switch between devices within the same procedure.

MODALIZER+ is now capable of capturing video streams from Web camera as MPEG-2 video file. To start capturing, click "Camera" button on the bottom left of the video panel.

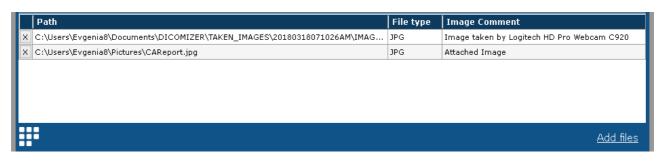


When connected to a scanner, clicking the red capture button launches the scanner's interface. The scanned documents are added to the bottom panel of attached documents.



You have an option to add comments to converted DICOM files.

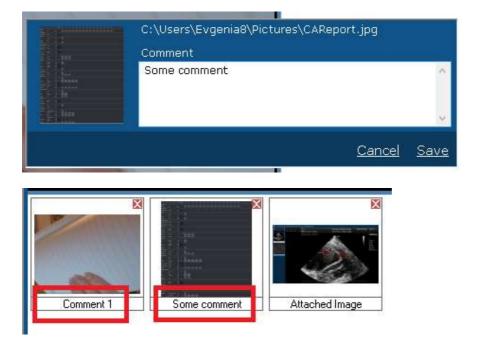
When on Acquisition screen image is captured / selected from the disk - application adds default comment to each of them ("Image taken by..." or "Attached image"):







You can change default comment by editing them in the grid or in pop-up window which can be opened by double-click on comment row in the image thumbnail:



NOTE: Default comments will not be inserted into converted files!



Unknown patient	<b>—</b>
1, 18/03/2018	
1, 10,03,2010	
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3 2* Some cor	nment 1 * Comment 1

If user selects to build one multi-framed DICOM file - comments will be inserted into "PerFrame" sequence:

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## 2.3. Filling a Report

MODALIZER+ is a great reporting tool, automated, customizable, and fully integrated with your PACS and Worklist Manager.

MODALIZER+ Formatted Report automatically fills patient and study information into report templates. The report templates are customizable. You can add your own logo and signature, and use your own stationery style.

There are 3 methods of creating a report:

- Formatted Report to create a new PDF using the predefined formatted template select required template from the list, and click "Formatted Report" button – this will create a new file from the template. Edit and save it as PDF. Close the editor. Verify that the PDF file was added in the bottom panel.
- 2. Attach an existing PDF file from your computer select your PDF files using the "Add files" button or drag-and-drop the files on the Acquisition screen.
- 3. Create a DICOM Structured Report by typing text in the report text panel.

<u>Note:</u> For more details on this feature read the <u>Reporting chapter</u>.

# 2.4. DICOM Removable Media Export (CD/DVD/USB)

To complete this task, please verify that you have a CD/DVD Writer in your computer. If you don't have a CD/DVD Writer, you can export the study to any removable media like Disk-on-Key or to a directory on your hard disk.

Prepare the DICOM files that you would like to export.

- Select "Create DICOMDIR" from the main screen.
- Select the folder with files to export.
- Click "Scan". MODALIZER+ will now read the data from the files and prepare them for export. MODALIZER+ will display the study details.
- Verify that the "Copy, Arrange and Rename" option is selected.
- Checkmark "Include DICOM Viewer to DICOMDIR".
- Select a destination folder to which MODALIZER+ will prepare the files for export.
- Click "Next".
- Select the destination drive for the media.
- Click "Burn to disc".
- After the operation completes eject the disc.



• Test the disk: Insert the media. If your AutoRun option is disabled click the DICOMViewer.exe - the study will be displayed in the DICOM Viewer.

Note: For more information see Burn CD/DVD.

# 2.5. Viewing DICOM files

To display a DICOM file simply drag-and-drop the files on the MODALIZER+ window. You can drag-and-drop one or more files, a directory or a DICOMDIR file. You can also drag-and-drop files and folders on the MODALIZER+ desktop icon.

Note: Read more about HRZ's DICOM Viewer.

# 2.6. Connecting To PACS

Maximize your MODALIZER+ capabilities by connecting to a PACS. Once MODALIZER+ is integrated with your Storage Server and Worklist Manager you will be able to use <u>Modality Worklist</u> to obtain Patient and Procedure parameters and <u>Query/Retrieve</u> to search for DICOM objects by criteria like patient name, id and birth date.

Read more about <u>Storages Servers configuration</u> and <u>WorkList Servers</u> configuration.

# 2.7. The Local Archive

MODALIZER+ includes a local DICOM Archive to store all created, converted, and imported studies. All the files in the local archive are stored according to the DICOM Standard using the DICOM file format.

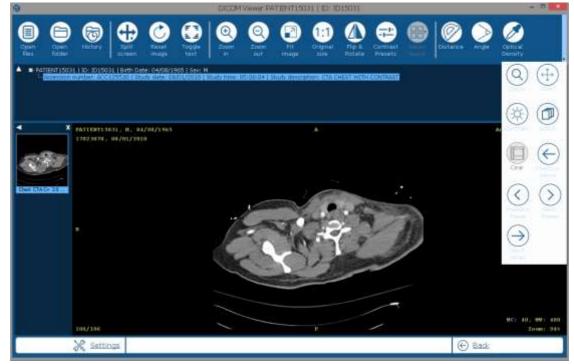
To enable the local archive open the <u>settings</u> screen and checkmark "Use Local Archive".



🕨 🕨 🕨	ed Sean	ch								Impo	ort files	<u>Search</u>
Patient name	:				Patient ID				Exa	ict study dat	e: <mark>15/10/</mark> 2	019 🗸 🗌
Patient Name	Patient ID	Sex	Birth Date	Accession Number	Study Date	Study Descriptio	No of Series	No of Images	Status	Institutior Name	Modalities In Study	Body Parts
dgdfgdfgf^gdf	2234234	м		2342344	20191	DICOMI		1	New		от	
etrt^etert^^^	44645	F	20191	456456	20191	DICOMI	1	1	New		от	
111^111^^^	111	м		111	20191	DICOMI	1	1	New		от	
222^222^^^	222	F		222	20191	DICOMI	1	1	New		от	
333^333^^^	333	F		333	20191	DICOMI	1	1	New		от	
444^444^^^	444	F		444	20191	DICOMI	1	1	New		от	
555^555^^^	555	0		555	20191	DICOMI	1	1	New		от	
6666^6666^^^	666	м		666	20191	DICOMI	1	1	New		от	
7777^7777^^^	7777	м		7777	20191	DICOMI	1	1	New		от	
8888^8888^^^^	888	м		88888	20191	DICOMI	1	1	New		от	
999^999^^^	999	F		999	20191	DICOMI	1	1	New		от	
fghfg^fhfgh^^^	345345	F	20191	345345	20191	DICOMI	1	1	New		от	
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# 3. DICOM Viewer

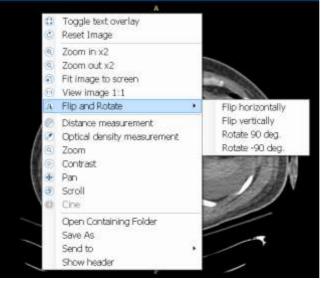
MODALIZER+ is a powerful and friendly Multi-Modality DICOM Viewer.





The DICOM Viewer consists of:

 Main display area – presents the selected image. Press CTRL-H to show/hide the DICOM attributes, CTRL-T to show/hide the text overlay. Right click to open the context menu with various operations, start/stop tools, open folder containing current image, send image to PACS and save it according to an original SOP class and transfer syntax (as JPEG/PNG/BMP/PDF/MPEG file). In addition each file can be saved as "Text" (DICOM dump):



- 2. Patients and Studies tree –right click on the study row to show the context menu with options to send the study to PACS, close it (remove from the viewer) or export it to external media (available only for studies from Local Archive).
- 3. Series thumbnails of the currently selected study right click on the thumbnail shows a context menu with an option to send the series to PACS.
- 4. Preview of the images within the currently selected series (as thumbnails in the bottom panel). If the images within the series are spatially related then they will be grouped and not displayed as individual files. If all the images of the current series are spatially related then no image thumbnail is displayed for the series. You can send a single image to PACS the right click on the image opens a context menu with such an option.

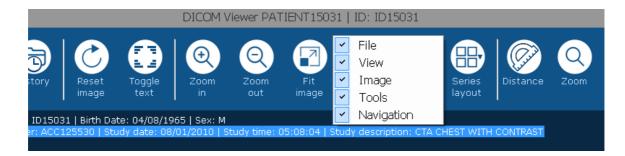
On selection series first image will be displayed in central area. To display another image - click on its thumbnail or click left/right arrow to load next/previous image.

 Tool buttons strip allowing to perform various operations on the current image and load new images from folder/file open dialog or from history record. DICOM Viewer operations can be made from the toolbar or from the context menu from right-click on the image panel.

The panels can be expanded/collapsed by clicking the white triangles at the top left of each panel.

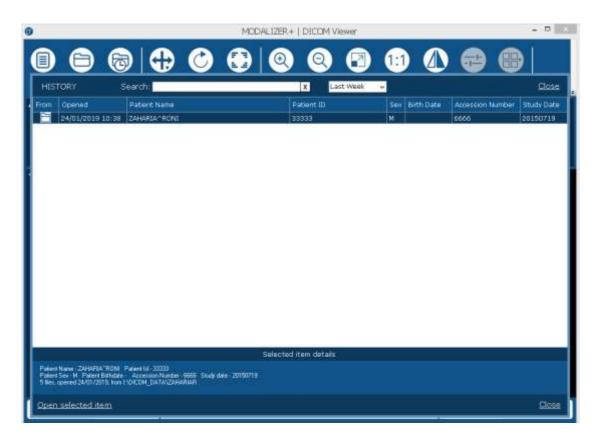


Right-click on tool menu background opens context menu allowing to select which groups of buttons has to be visible (selection is saved between application runs):



# 3.1. Loading images to the Viewer

There are few ways to display DICOM files - you can drag and drop the items or to click "Open Files" to browse for a folder and select the files to view. In order to display an entire folder's content use "Open Folder" button. There is also an option to open files from the History screen:

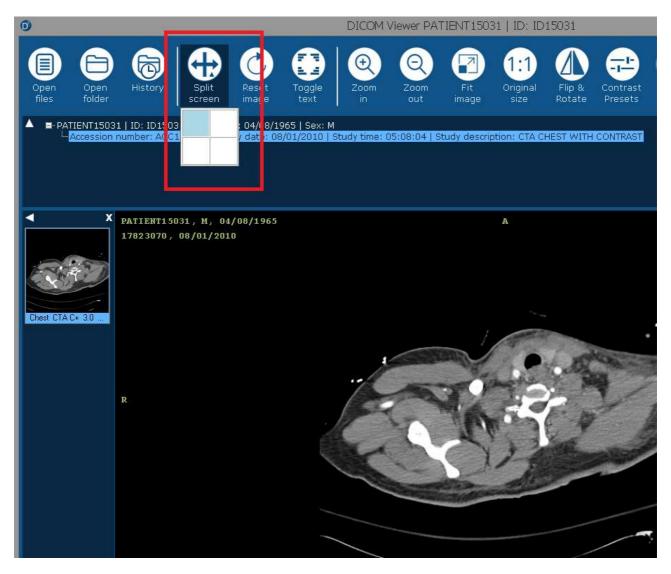


Each "open action" (Files, Folder, DICOMDIR etc.) contains one or more study rows. Study row templates is "[Patient Name],[Patient ID],[Accession Number]". To find study - type required text in the "Search" field on the top. Select entire



action as shown in the image above or single study, check its details in the panel below and click "Open selected item" to load files.

If a DICOM file contains embedded video – the viewer displays it in the built-in video player (if possible), or in system Video player. Embedded PDF will be opened in system PDF viewer, SR report - in built-in HTML viewer.



There is also an option to split display area into several parts:

User can select one of the following options to split viewer display area: one part, two parts horizontally, two parts vertically, four parts:



0	DICOM Viewer PATIENT15031	ID: ID15031		
Open Open Files Open Files	Reset image text in	Q Zoom out		lip B. Contrast state Presets
<ul> <li>PATIENT15031   ID: ID1503</li> <li>Lecossion number: ACC1</li> <li>PATIENT15031, M, 0</li> <li>17823070, 08/01/203</li> <li>Dest CTACs 28 w</li> <li>R</li> <li>I (106</li> </ul>		1	obon: CTA CHES	
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0		DICOM VI	ewer PATIENT150	31   ID: ID15	5031		_		×
Open files		Split creen	Toggle text	n Q Zoom out	Fit image	1:1 Original size	Fip & Rotate	Contrast Presets	
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	X Settings					€ Bac	k		

Different study might be opened in each part. To do it user needs to select required part by clicking on its area (selected part is marked by red border) and open study using usual ways ("Open files"/"Open folder"/"History" buttons). Another option is drag-drop file/folder from Windows explorer onto required part which will be selected automatically.

Click on each part automatically loads its study into series/images thumbnails panels:









### 4.2. Using Hounsfield units Contrast Presets

MODALIZER+ comes with a pre-defined contrast presets, you can open this list by clicking "Contrast presets" tool button:



Select required presets to change WC/WW values of the currently opened image.

New custom preset can be added by filling Name/WC/WW values in the bottom line and clicking "Add" button.

You can delete existing preset or edit it in the pop-up window:



If an image contains one or more VOI LUT (Values of Interest Lookup Tables) their values will be added to the list of contrast pre-sets.





When opening an image with VOI LUT the first table is automatically applied by <u>RZDCX</u>.

# 4.3. Distance /Optical Density / Angle Measurements tools

You can measure distance on the image (in mm for calibrated images, in pixels for others), calculate optical density in any selected point (for CT images) OR calculate angle between three points. To start drawing/moving click on "Distance"/"Optical Density" / "Angle" tool button:





To stop tool click on the button again. If measurement tool is not active, all existing measurements remain visible but you cannot move or delete them.

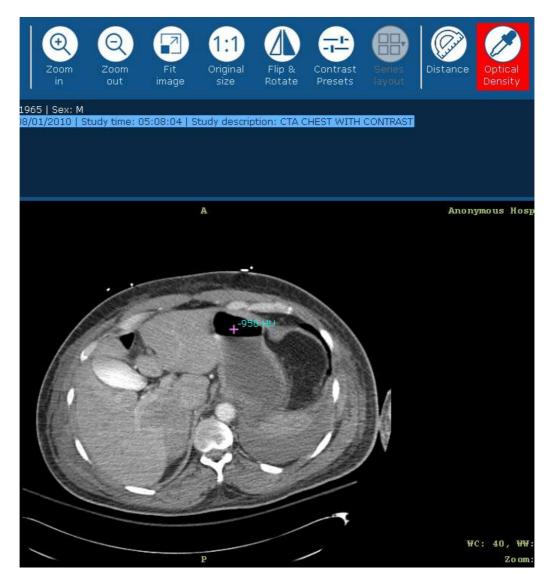
To start "Distance" drawing, click the left mouse button within the image panel. Start point will be marked as cross and dashed line will appear. Move mouse pointer to another place and left-click again to mark end point. Measured distance will be displayed on mouse move.

To start "Angle" drawing, click the left mouse button within the image panel. Start point will be marked as cross and dashed line will appear. Move mouse pointer to another place and left-click again to mark second (angle peak) point, repeat this to define end point. Measured angle will be displayed on mouse move (after peak point was created)





To calculate optical density just click left mouse button once on the selected spot:



To change existing measurement select start/end cross or entire line (enter mouse pointer), press mouse left button and move pointer holding left-button pressed to required place and release mouse.

To delete distance line select any part of the line and click on "Delete" button on the keyboard.

You can save measurement lines / point as Grayscale Softcopy Presentation State module file under a new series (about viewing of GSPS modules - see 4.7). When user closes a study, returns from Viewer screen or exits application, and there are one or more new distance measurements, one of the following pop-up screens will be displayed:



<u>_i</u> Study	has unsaved measurements	
	ARDIOART, ID : 001co 40303, description:	
🔵 Add entire	study to local archive	
Send to:	Default PACS [PACS, localhost:104] Entire study will be sent	~
• Save in:		
O Don't save	(if destination is empty - files will be saved in study folder)	
		<u> </u>

(Opened study is not part of LocalArchive)

/ Study has unsaved measurements		
Patient Name: aaa^ffff, ID : ryrtyrt Study date: 20160710, description: fgnfghfghfg		
• Add new GSPS module/edited files to local archive		
Send to: Default PACS [PACS, localhost:104] Entire study will be sent	~	
Save in:		
(if destination is empty - files will be saved in study folder) Don't save		
	<u> </u>	<u>)K</u>

(Opened study is part of LocalArchive)



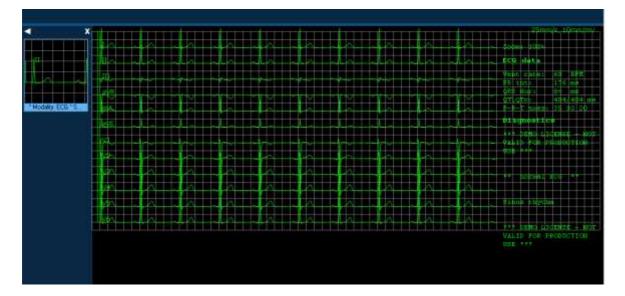
<u>_i</u> Study	v has unsaved measurements	
	atName2, ID : PatID2 60101, description:	
Add to loc	al archive	
O Send to:	Default PACS [PACS, localhost:104] New GSPS module and edited files will be sent	~
Save in:		
🔵 Don't save	(if destination is empty - files will be saved in study folder)	
		<u>ок</u>

(Opened study was retrieved from PACS)

- 1. Select "Add entire study to local archive" to insert new GSPS file and all other files of the study into Local Archive. This option is available only if "Use local archive" was selected on the General Settings. If a study with the measurement is already a part of the Local Archive only the new GSPS file will be added
- 2. Select "Send to" option to send an entire study or only new files to PACS (if a study was retrieved from PACS, source PACS will be selected by application).
- 3. Select "Save in" to store new GSPS file in selected folder.
- 4. Select "Don't save" if you don't want to add GSPS file to the study

#### 4.4. ECG Viewer

MODALIZER+ can display DICOM 12 Lead ECG Instances.





Use the ECG Display Settings tab in the configuration screen to select the graph formats (click "Setting" button from the Viewer, select required parameters and click "Back" on Settings screen. New display parameters are immediately applied.

▼ ECG Display Settings	🖌 Use anti-aliasing
Lead Format: <mark>Regular                                     </mark>	iray/Green 🗸
3×4	
► Overn <sup>3x4 + 1</sup> 6x2 6x2 Average Complex	✔ Use template

### 4.5. Using Zoom/Pan/Contrast/Scroll tools

To start/stop any of these tools click the tool button. When the tool is active the button background is set to red and the mouse pointer changes to the tool mouse icon:



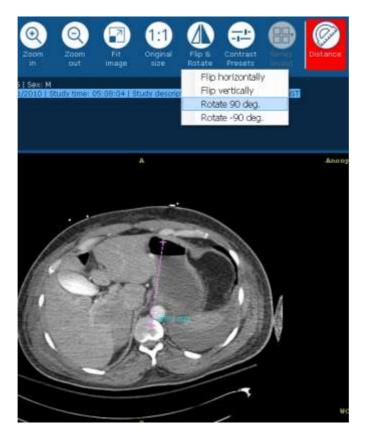
To change image zoom/contrast, move zoomed image inside viewer panel (Pan Tool) or scroll frames - press left mouse button and move pointer holding left button pressed.

#### 4.6. Flip and Rotate tool

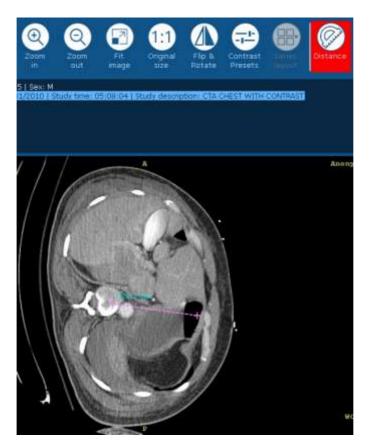
Available actions: Flip Vertically, Flip Horizontally, Rotate 90 Clockwise, Rotate 90 Counterclockwise. All measurements on the current image will be changed accordingly

Before:





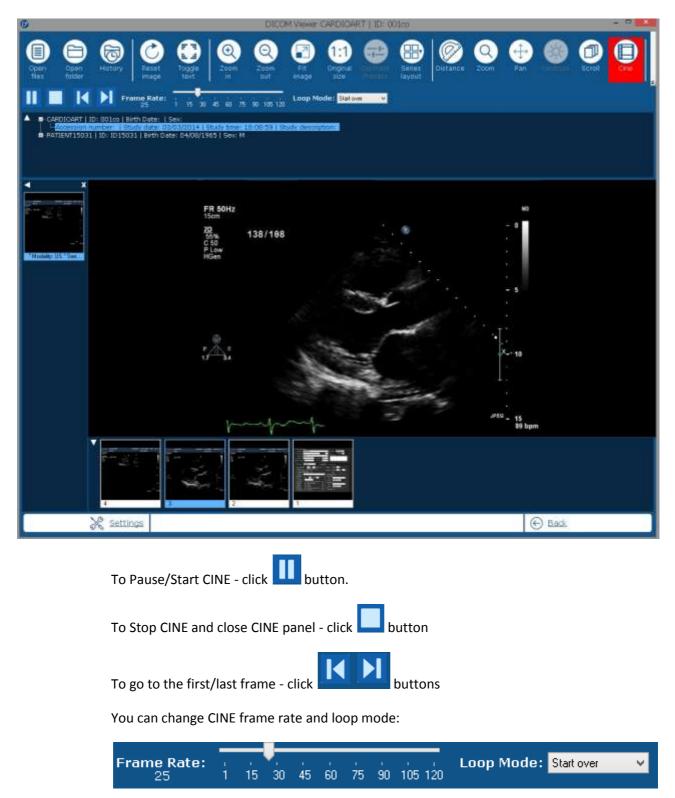
After:





# 4.7. CINE tool

If DICOM file contains multi-frame image CINE mode is enabled and the cine buttons can be used.





# 4.8. Display Grayscale Softcopy Presentation State module

MODALIZER+ can display relative annotations (graphics, text and etc.) stored in files of specific DICOM format. When a user opens a study, the application selects all such files, load their data (relations between annotations and study instances/frames, annotations types/positions etc.) and converts it to graphic objects drawn on the corresponding images.

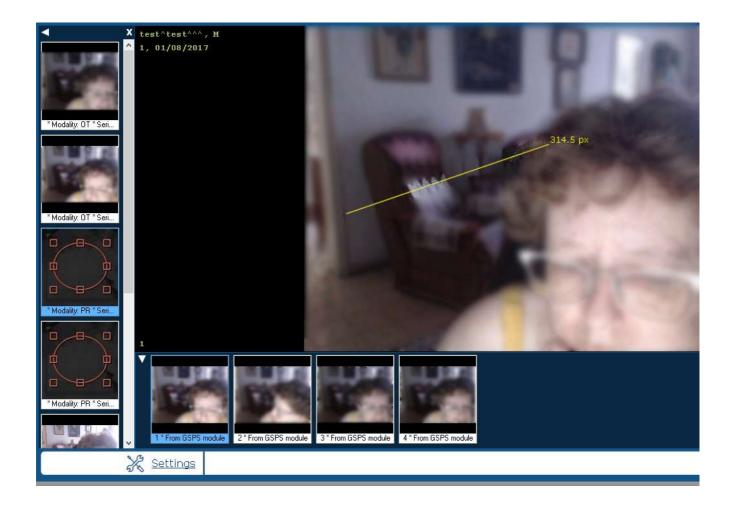
Each GSPS module (series with PR modality) is displayed as separate thumbnail in the left panel like any other series.

When user clicks a GSPS (modality PR) series, the PR series thumbnail is highlighted, each graphic object containing in GSPS module is displayed as separate image thumbnail in the bottom panel and first of them is displayed in the main area on the image and frame it is referencing.

Click on each image thumbnail loads corresponding image/frame and graphic objects into main area.

When user clicks a non-PR series (images), it will be displayed as "pure image" without drawing.

When the PR series is selected and user chooses "Show header" - the tags of the PR is displayed ("Edit" for PR files is not allowed)





### 4.9. Header view and edit DICOM object

To view all tags containing in the current DICOM file - right-click on the image and select "Show header" or press Ctrl-H .

Hierarchical tree view will be opened so that sequences might be opened/closed by user.

	(0008,0050)	AccessionNonber	ACC	125830	10		SH:	
	(0008,0060)	Bodelity	CT		2	-	CB	-1
	(0008,0070)	Mapufacturer	SIE	RENS	8	-	Lö	_
21	(0006,0090)	InstitutionName	kno	nymous Hospital	18	-	10	_
	(0008,0081)	InstitutionAddress	804	th Bascow Ave San Jose-Sice3f- Pleasanton US	40		BT	
	(8009, 8099)	ReferringPhysicianName	REF	125530	1.0	-	PN .	-1
	(0006,1010)	StationName	C75	1671	11	-	≲11	-1
	(0008,1030)	StudyDescription	CTA	CHEST WITH CONTRAST	24	-	10	-1
	(BOOS, 103E)	SeriesDescription	Che	at CTA C+ 3.0 830f	2.9	-	10	_
	(8008,1849)	InstitutionalDepartmentName	ĊŤ		2	-	L0	-
	(8005,1045)	PhysiciansOfRecord	LEE	*GEORGE K*	14		121	-
	(0008, 1060)	NameOfPhysiciansPeadingStudy	TAL	ITHA' TRAVIS	1.6		121	
	(0008, 1070)	OperatorsBase	JBB		Ť.		FN	
	(0000) 10901	ESDIL OCCUPET HOUSE LINESE	950	88.108.18	44	-	ЪV	_
	(0009, 1111)	ReferencedPerformedFrocedureStepSequence			112		80	
	E Iten[1]	a hanna an an an an an a			. 1			
	(0000, 1	150) ReferencedSOPCiassWID	100	1.2.840.10008.3.1.2.3.3		24		ui
	(0000,1	155) PeferencedSOPInstanceUID		1.3.12.2.1107.5.1.4.51671.30000010010810292296800000006		56		UI
	g (0008, 1120)	ReferencedPwtientSequence			12.4	1	50	
	(8008,1198)	ReferencedImageSeguence			114	5	30	
	(0008,2112)	SourceImageSequence			120		80	
	(0009,0000)	FrivateGroupLength	28				uL	
	(0009,0010)	PrivateCreator	SIE	MENS OT VAL DUMMY	28		LQ	
	(0010,0000)	PatientGroupLength	222		4		ΩĽ	
	(0010,0010)	patlentName	PAT	IENT15011	12		PN	
	(8010, 0020)	patientID	ID1	5031	1	- 1	LO.	

NOTE: By default all private tags are displayed with "?" name, but you have an option to use dicom.dic file (located in the installation folder) to define name of any private tag. Format of the dicom.dic tag line is:

# Tag	VR	Name	VM	Version
(0027,0000)	UL	SamplePrivateGrpLength	1	RZDCX

All columns MUST be separated by "Tab".

Dicom.dic file from the installation package contains few lines as example. If you don't need them - open file in Notepad and delete unnecessary lines or just delete dicom.dic from the installation folder.



To start editing - select "Show header" and click "Edit" button:

DICOM Tags	Edit Alter by name:	¥ Fitter by value:	
Tag enun	Tug name	Value	Leng
10002,0000)	FileMetaInformationGroupLength	224	4
(0002,0001)	FileMetaInformationVersion	273562496	2
10002,00021	RediaStorageSOFClassUID	1.2.840.10008.5.1.4.1.1.2	26
(0002,0003)	MediaStorageSOPInstanceUID	1,3,12,2,1107,5,1,4,51671,30000010010809199795300004222	56
[0002,0010]	TransferSyntaxUID	1.2.840.10008.1.2	18
(0002,0012)	ImplementationClassUID	1.2.276.0.7230010.3.0.3.5.3	18
[0002,0013]	ImplementationVersionName	OFFIS_DCRTE_353	16
(0002,0016)	SourceApplicationEntity7itle		18
(0008,0005)	SpecificCharacterSet	ISO_IR 100	10.
(0005,0005)	Image Type	CRIGINAL/PRIMARY/AXIAL/CT_SONS SPI	34
(0008,0016)	sopClass@id.	1.2.840.10008.5.1.4.1.1.2	26
(0008,0018)	sopInstance01D	1,3,12,2,1107,5,1,4,51671,30000010010889193795300004222	56
10008,00281	StudyDate	20100108	8
(0008,0021)	SeriesDate	20100108	8
(0005,0022)	AcquisitionDate	10100108	8
10008,00231	ContentDate	20100108	8
(0008,0038)	StudyTime	050804.000000	14
(0005,0031)	SeriesTime	052056.593000	14
(0008,0032)	AcquisitionTime	052209,184113	14
10005,00331	ContentTime	052209,184113	14
10008,00501	AccessionNumber	ACC125530	10.

DICOM Object Editor Screen allows user to:

- Add tags
- Add sequence
- Add sequence item
- Add/Edit/Delete tag within sequence
- Duplicate sequence item
- Remove tags
- Remove sequence item
- Change value of tags

A new instance is generated from the original and updated according to the DICOM standard:

1. New series created

2. Referenced instance sequence (0008,114A) with reference to the original series/instance inserted into the new instance

New instance will be opened for editing:



Search	and add ta	ig Name.	jue: (	1.0
Tag	nit tex	Tag name	Value	Lengt
(00)	102,00001	FileHetsInformationGroupLength	188	a
	02,00011	FileRetaInformationWersion.	273243936	2
AC+ 30 (00)	15000,500	MediaStorageSOPCIaseU1D	1.2.040.10000.5.1.4.1.1.2	35
(00)	102,00031	BediaStorageSOPInstanceUID	2.16.124.113547.6021.1.7.2022247267.10400.1502255540.2	54
(00)	02,00101	TransferSyntax010	1.2.840.10009.1.2	18
(00)	02,00121	ImplementationClass01D	2.16,124,113643.6021.1	22
(00)	102,00131	ImplementationVersionName	RZDCE_2_0_6_1	19
(00)	108,00051	SpecificCharacterSet	150_1R 100	10
(00	08,00081	ImageType	ORIGINAL/PRIMARY/AXIAL/CT_SORS SPI	-34
	00161	sopClassWid.	1.2.940.10000.5.1.4.1.1.2	36
(00	08,0018)	sopInstance01D	2.16.124.113543.6021.1.3.2022243267.10400.1502255540.2	54
(00)	08,0020)	StudyDate	20100108	8
(00)	08,00211	BeriesDate	20100108	8
(00	108,00221	AcquisitionDate	20100108	
(00)	108,00231	ContentDate	20100108	8
(00)	000,00001	StudyTime	050804.000000	14
(00)	08,00311	SeriesTime	052056.593000	14
10.0	15600.800	AcquisitionTime	052209-184113	14

To add tag - use "Search and add tag" options. When user click "Add" button - tag will be inserted on main level or inside selected sequence

User can copy entire sequence, delete it or add tag into it. To select one of the options - rightclick on sequence row to open contest menu.

DICOM T	ags	Filter by name:	x	Filter by value:
Search and	d add ta	ag Name:		
(0008,	1048)	PhysiciansOfRecord		LEE^GEORGE K <sup>A</sup>
(0008,	1060)	NameOfPhysiciansReading	Study	TAL ITHA^TRAVIS
(0008,	1070)	OperatorsName		JBB
(0008,	1090)	ManufacturerModelName		Sensation 16
	1111)	ReferencedPerformedProc	edureStepSequence	
<pre></pre>	Ad	ppy sequence Id tag within sequence elete sequence	ze nce	
	2112)	SourceImageSequence	-	
(0009,	0000)	PrivateGroupLength		28
(0009,	0010)	PrivateCreator		SIEMENS CT VA1 DUMMY
(0010,	0000)	PatientGroupLength		222
(0010,	0010)	patientName		PATIENT15031
(0010,	0020)	patientID		ID15031
(0010,	0021)	IssuerOfPatientID		PrimaryDomain
(0010,	0030)	PatientsBirthDate		19650804
(0010,		PatientsBirthTime		000000.000000
(0010,	0040)	PatientSex		M
(0010,	1010)	Patientslge		044Y

To change tag value - double-click on its row



	COM Tags	Fiber by name: X	Filter by value:
Sea	rch and add ta	ag //Namer	
	(0008,0060)	Nodality	InstitutionName
	(0008,0070)	Ranufacturer	Anstruction value
	(0008,0080)	InstitutionName	Value Anonymoux Hespital
	(0008,0081)	InstitutionAddress	
	(0008,0090)	ReferringPhysicianName	Cancel Sav
	(0008,1010)	StationName	CIDAVIA
	(0008, 1030)	StudyDescription	CTA CHEST WITH CONTRAST
	(0008,103E)	SeriesDescription	Generated by DICOMIZER
	(0000, 1040)	InstitutionalDepartmentName	CT
	(0008, 1048)	PhysiciansOfRecord	LEE*GEORGE K*
	(0008,1060)	NameOfPhysiciansReadingStudy	TALITHA*TRAVIS
	(0008, 1070)	OperatorsName	JBB
	(0008,1090)	ManufacturerNodelName	Sensation 16
· ·	(0008,1111)	Reference dPerformedProcedureStepSequence	
12	(0008, 1120)	ReferencedPatientSequence	

#### To delete tag - right-click on its row and select "Delete tag"

L	· ·	
(0008,1040)	InstitutionalDepartmentName	CT Delete ter
(0008,1048)	PhysiciansOfRecord	LEE^, Delete tag
(0008,1060)	NameOfPhysiciansReadingStudy	TAL ITHA^ TRAVIS
70008 10701	OneratorsName	JBB

On closing study user will be suggested with several option concerning new instance:

Study has edited files	
Patient Name: PATIENT15031, ID : ID15031 Study date: 20100108, description: CTA CHEST WITH CONTRAST	
Add entire study to local archive	
Send to: Default PACS [PACS, localhost: 104] Entire study will be sent	~
O Save in:	
(if destination is empty - files will be saved in study folder) Don't save	
	<u>ок</u>

If user decides to save new instance - Rejection Notes KOS Document will be created as new series.

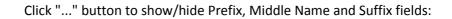


# 5. Working with Studies

## 5.1. New Patient

Select the "New Patient" option from the main menu:

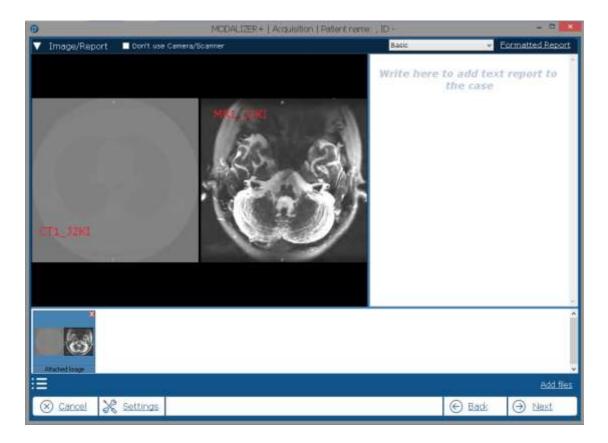
0		MODAL	IZER+   New patient		- • ×
	W PATIE	INT			
First Name Last Name					
Patient ID Patient Sex	<ul> <li>Male</li> <li>Female</li> </ul>	• Other • • Not Set	Patient Birth Date 🗖 24/01/2019 16		
Accession Number					
🛞 <u>Cancel</u>	🖁 Settings			€ Back	⊖ <u>Next</u>



0	MODALIZER+   New patient	- • ×
	W PATIENT	
Prefix		
First Name		
Middle Name		
Last Name		
Suffix		
Patient ID		
Patient Sex	Male Female Other O Not Set     Patient Birth Date 24/01/2019	
Accession Number		



#### Enter patient's data (not required), then click "Next".



Compose the study with images and report as explained in the <u>Create a new Study</u> section then click "Next".

Create formatted PDF report (optionally) as explained in Writing a Report

<u>Note:</u> Click the button **i** to change the style of the presentation (thumbnails/list).



9	MODALIZER+   Convert to DIECM   Patient name: , ID -		×
CONV	ERI		
Barra sa I ma	sn'E vgensel? Documents/MODALZERPLUS/201901241025094M		Browse
Contraction of the second second	Hedin and Inages taken umg MODALEER+		alonas
Create report asi	O DICOM SR.   PDF file		
4			
Image Format to save in D			
Compression quality:	50%		
Create one Multi-Frame	e File		
ACTION Convert			
Convert and create			
	DSRSVC [DSRSVC, localhost; 104] =		
⊗ Cancel 🔏 Set	ttings (©	Back	→ Next

The "Convert" screen consists of three panels:

- Panel #1:
  - Destination Folder where the converted files will be saved.
     A new directory is created in your documents folder for every conversion under the MODALIZER+ main folder. If "Use local Archive" option is selected in the Settings screen destination folder will be created as sub-folder of storage place defined in Settings. If not you can change destination to any folder on your computer.
  - Report Title.
  - Create report as MODALIZER+ allows you to create a DICOM SR (default) or as an encapsulated PDF.
- Panel #2:
  - Image Format to save in DICOM:
    - "Automatic" (default) the files will be converted to DICOM the way they are. JPEG Images will be converted as JPEG and other as uncompressed.
    - "Uncompressed all files will be first uncompressed and converted to DICOM.<sup>1</sup>

<sup>&</sup>lt;sup>1</sup> Changing the image format may result in quality loss.



- "JPEG" all Images will be converted to JPEG as Encapsulated JPEG using the JPEG Lossy Transfer Syntax.<sup>23</sup>
- Create one Multi-Frame File use this option when you have a series of related images. All images must be the same format and the same size.
- Panel #3:
  - Convert converting only. The converted files will be saved in the destination folder.
  - Convert and create DICOMDIR. DICOMDIR is a file that includes patient and study information and links to all the converted files.
  - Convert and send to PACS. In order to save the study on PACS you need to configure it. See <u>Storage Server configuration</u>.

## 5.2. Sending DICOM Images to the PACS

DICOM files are typically stored in a PACS. This allows accessing them from other DICOM applications.

After acquiring the study images the "Convert" screen is displayed. Select an option "Convert and send to PACS". If PACS wasn't defined yet click "<u>Settings</u>" and configure it. Then click "Next".

Click "Send to".

How to send the same study to multiple destinations

<sup>&</sup>lt;sup>2</sup> Some PACS May not allow storing JPEG Compressed DICOM Images.

<sup>&</sup>lt;sup>3</sup> JPEG Compressed Images usually take less disk space and may be faster to store and restore from the PACS.



#### 5.3. Modality Worklist Query

In order to use the Modality Worklist Service configure a Worklist Server.

Click "Modality Worklist" in the main menu:

9				M	DOALIZER+	Modality W	orklist   DS	PSVE				×
0	×		un an									
	) МО	DALI	ry n	<b>IOR</b>	KLIST							
	Advanced	Search										Search
Patients I	list (double-r	dick on the m	ow or select	row in the	e grid and click	NTNext()	DS	RSVC [DSRS	VC, locaho	rt: 184]		×
Last Name	First. Name	Patient ID	Birth Date	Sei	Acc.0	Requested Procedure Desc.	Sheduled Procedure Start Date	Sheduled Procedure Start Time	Sheduled Procedure Step Desc.	Modality	Station Name	Fist. Phys. Name
dadia	dfadfa	eteter	14/01/20.	0	2419814		14/01/20	08:41:00		BDUS		
(X) C	ancel 👌	🖗 Setting	ser.						T	Back	18	

The basic search is done by the patient name or by patient ID. If you are not sure in patient's name spelling you can use wildcard characters "?" and "\*". "?" is used to represent a single character and "\*" represents any number of characters. Click "Advanced Search" to present additional search options like a range of days when the study has been created or by the accession number. Clicking "Search" with no search parameter set will list all the existing studies. This is not recommended and it may take a very long time.

Search also can be started by pressing "Enter" in any text box in the Advanced Search area.

A default search filter can be set in the settings screen for "today" and for a specific scheduled AE title. To enable this mark the appropriate check-boxes in the "<u>Worklist</u> <u>Server</u>" settings panel.



On screen opening query will be sent to the default MWL server (one currently selected in the settings screen) but you can switch to another server by selecting it from the list located under search panel.

MODALIZER+ uses the attributes received from the MWL Query in the new study Images and report.

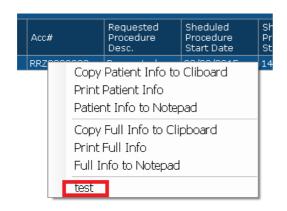
Double click on the row from the list of results or clicking the "Next" button will lead you to document the study by creating images and <u>adding a report</u>.

**NOTE:** If "Two step verification" option on the "Worklist Servers" section of the settings screen is selected - all the data from the selected MWL entry will be displayed in a popup modal windows before starting the procedure:

0		MODALIZER+   Mo	dality Worklist   DSRSVC			- 🗆 🛛
	MODALIT	Y WORKLIS	ЭT			
► Ad		Full Pro	ocedure Info			<u>Search</u>
Patients list	Patient name:	Smith^Matt	Patient ID	111111111		localhos: 🗸
Last I Name I	Patient sex: Requested	М	Patient birthdate	15/10/2019		Ref. Phys. Name
Smith M dsdsgdf d	Procedure	Physical examination			<b>^</b>	Dr.Snape gjghjghj
	Accession Number:	731106451350236	Modality	от		
	Station Name:	test	Referring Physician Name	Dr.Snape		
	Procedure Start Date:	25/09/2019	Procedure Start Time	11:15:00		
	Scheduled Procedure Step Description	Some tests			<b>~</b>	
				<u>Start procedure</u>	<u>Cancel</u>	
🛞 <u>Can</u>	cel 🔀 <u>Setting</u> s	<u>User manual</u>		€ <u>Back</u>	$\ni$	<u>Next</u>

Right click on the row opens menu allowing to copy/print patient and study info or execute some custom action using selected data ("test" in the below image):





How to configure Customs Actions.

#### 5.4. Query/Retrieve - Searching the PACS

Query/Retrieve (Q/R) is a DICOM Service that allows to search for DICOM objects in a PACS using search criteria (patient name, date of creation of the images, modality etc.) and retrieve them for viewing or other purposes. To use Q/R you configure a <u>Storage Server.</u>

Select "Query Retrieve" from the main screen.

erter^ee         46546         M         I         20190115         051942.1         0T         4645655         1         1         2.16.124.           PATIENT1         ID15031         19650804         M         17823070         20100108         050804.84         CT         ACC1255         1         1         1.2.124.1           rrmm*nrm         24234234         20190115         M         1         20190115         050804.84         OT         42344         1         1         2.16.124.           Tencom         PAT         20110411         222002.2         SR         1         1         1.2.840.1	0				MO	DALIZER.+	Query Ret	rieve   D	SRSVC				- 0 ×
Patient name:       Accession number:         Patient ID:       Study date:       24/03/2019 •         Destination Folder       C:\Visers\Exgenia8\Documents\DICOMIZEP\/RECEIVED       DSRSVC [DSRSVC; localhost: 104]         Studies list (to retrieve selected study double-click on the row or select row in the grid and click "Next")       Ref.       #Sories       #Inst       Study Instance         Patient:       Disposition folder       Situdy double-click on the row or select row in the grid and click "Next")       Ref.       #Series       #Inst       Study Instance         Patient:       Name       Birth Date       Sex       Study ID       Study Date       Mod In Study       Acc#       Ref. Phys. Name       #Series       #Inst       Instance UD         1592052.       S0_5\$*1       19230101       M       17031       20040122       0816311.1.1.0.T       I       1       1.2.840.1         1592052.       S0_5\$*1       19230101       M       17031       20040122       081631.1.0.0T       I       1       1.2.840.1         1592052.       S0_5\$*1       19230101       M       17031       20040122       081631.1.0.0T       I       1       1.2.840.1         1592052.       S0_5\$*1       19230101       11614       20190115       051942.10T		) QUE	RY I	RET	RIEVE								
Patient ID:         Study date:         24/03/2019         Image: Comparison of the study date:         24/03/2019         Image: Comparison of the study date:         24/03/2019         Image: Comparison of the study date:         DSRSVC [DSRSVC; localhost: 104]           Cestination Folder         C:\Users\Exgenia8\Documents\DICOMIZEP\/PECEIVED         DSRSVC [DSRSVC; localhost: 104]         DSRSVC [DSRSVC; localhost: 104]           Studies list (to retrieve selected study double-click on the row or select row in the grid and click "Next")         Mod In Study         Acc#         Ref. Phys. Name         #Series         #Inst         Study UD           1592052.         S0_5\$\$*1         1920101         M         17031         20040122         091631.1.         CT         Image: Phys. Name         #Series         #Inst         Study UD           1592052.         S0_5\$\$*1         1920101         M         17031         20040122         091631.1.         CT         Image: Phys. Name         #Series         #Inst         Study UD           1592052.         S0_5\$\$*1         1920101         M         17031         20040122         091631.1.         CT         Image: Phys. Name         #Series         #Inst         Study UD           1592052.         S0_5\$*1         1         1         1.2.840.1         1.2.840.1           1592052	► Ac	dvanced S	earch										Search
Destination Folder         C:\Users\Evgenia8\Documents\DICOMIZEP\RECEIVED         DSRSVC [DSRSVC; localhast: 104]           Studies list (to retrieve selected study double-click on the row or select row in the grid and click "Next")         Med.         Pet.         Pet.         Posters:         #Inst         Study Instance         Study         Study         Didu         Med.In         Pet.         Phys.         #Series         #Inst         Study Instance         Study         Study         Med.In         Acc#         Pet.         Pits         #Inst         Study Instance         Study         Study         Study         Med.In         Acc#         Pet. Name         #Series         #Inst         Study Instance         Official stance           1592052:         SD_\$\$\$*1         1920101         M         17931         20049122         0916311         CT         1         1         1.2.840.1           abdomen         011519         11614         20190115         1051942.1         OT         4645655         1         1         2.16.124.           erter^*ce         465466         M         1         20190115         051942.1         OT         4645655         1         1         2.12.124.1           rmtr^*mm*rn         24234234         20190115         M<	Patient na	ma:							Accession nu	mber:			1
Studies list (to retrieve selected study double-cick on the row or select row in the grid and click 'Next')           Patient:         Date         Study         Study         Date         Time         Med.In         Acc#         Ref. Phys.         #Series         #Inst.         Study Instance           1592052.         5D_\$\$*1         19230101         M         17031         20040122         0016311         CT         1         1         1.2.840.1           abdomen         011519         11014         20190115         110530.5         CT         1         1         1.2.840.1           erter^ree         46546         M         1         20190115         0151942.1         OT         4645655         1         1         2.16.124.           PATIENTI         1015031         19650804         M         17823070         20100108         050804.84.         OT         Acc1255         1         1         2.16.124.           Terr^-rer         4242342         20190115         M         1         20190115         050804.86         OT         424244         1         1         2.16.124.           Terr^-rer         PAT         20110111         221002.2         SR         1         1	Patient ID	. (-							Study date:		24/01/2019 -		
Studies list (to retrieve selected study double-click on the row or select row in the grid and click "Next")           Patient: Name         Bitth Date         Sex         Study ID         Study Date         Study Time         Mod In Study         Acc#         Ref. Phys. Phys. Name         #Series         #Inst.         Study Instance           1592052         50_\$\$*1         19230101         M         17031         20040122         081631.1         CT         1         1         1.2.840.1           abdomen         011519         11614         20190115         110530.5         CT         1         1         1.2.840.1           erter^hea         465456         M         1         20190115         015942.1         OT         4645655         1         1         2.16.124.           prim*m*mr         24234234         20190115         M         1         20190115         050804.84.         OT         462555         1         1         1.2.124.1           Ten*ner*         24234234         20190115         M         1         20190115         050804.84         OT         42344         1         1         2.16.124.           Ten*ner*         20110411         222002.2         SR         SR	Destination	Folder Ct	Users\Evider	nia®\Diocu	manits\DICOMI	ZERVRECEIVI	ED	-			DSRSVC [DSRS	VC. localho	st: 104] 👻
Patient: Name         Batent: ID         Bith Date         Study ID         Study Date         Study Time         Mod.In Study         Acc#         Ref. Phys. Name         #Series         #Inst #Inst Instance UID           1592052         50_\$\$*1         1920101         M         17931         20040122         0916311.         CT         1         1         1.2.840.1           abdomen         011519         11614         20190115         10530.5         CT         1         1         1.2.840.1           erter^*ea         46546         M         1         20190115         051942.1         0T         4645655         1         1         2.16.124.           PATIENTI         1015031         19650804         M         17823070         20100108         050804.84         CT         ACC1255         1         1         2.16.124.           TH*^^mm*********************************			12.4		1		a waa	and and	where the street the				
1592052         50_55*1         19230101         M         17031         20040122         001631.4         CT         1         1         1.2.840.1           abdomen         011519         1         11614         20190115         110530.5         CT         1         1         1.2.840.1           erter^ee         46546         M         1         20190115         051942.1         0T         4645655         1         1         2.2.6.124.           PATIENT1         105031         19650804         M         17923070         20100108         050804.84         CT         ACC1255         1         1         1.2.124.1           rmm^^nmm         2423423         20190115         M         1         20190115         050843.8         0T         42344         1         1         2.16.124.           T4^^^^^         74         PAT         20190115         20190115         05084.88         0T         42344         1         1         2.16.124.	Patient	Patient	Birth		Study	Study	Study	Medulin	T and a second	Phys		#Inst	Instance
erter^ee         46546         M         1         20190115         051942.1         0T         4645655         1         1         2.16.124.           PATIENT1         1015031         19650804         M         17823070         20100108         050804.84         CT         ACC1255         1         1         1.2.124.1           rrmr^mrr         24234234         20190115         M         1         20190115         050843.8         OT         42344         1         1         2.16.124.           T4^^^^         PAT         20110411         222002.2	1592052	SD_\$\$*1	19230101	M	17031	20040122	081631.1	ct:		The fire		1	
PATIENTI         ID ISO31         19650804         M         17823070         20100108         050804.84         CT         ACC1255         1         1         1.2.124.1           rmm*mm         24234234         20190115         M         1         20190115         050804.84         CT         ACC1255         1         1         1.2.124.1           rmm*mm         24234234         20190115         M         1         20190115         05084.84         CT         42344         1         1         2.16.124.1           T4^^^^         PAT         20110411         222002.2	abdomen	011519	1	10	11614	20190115	110530.5	CT			1	1	1.2.840.1
mmr^nmm.         24234234         20190115         M         1         20190115         050843.8         OT         42344         1         1         2.16.124.           T4^^^^<	erter^ee	46546		M	1	20190115	051942.1	OT	4645655		1	1	2.16.124
T4^^^^ PAT 20110411 222002.2 58 1 1 1.2.840.1	PATIENT1	ID15031	19650804	M	17823070	20100108	050804.84	CT	ACC1255		1	1	1.2.124.1
	mm^mm	24234234	20190115	M	1	20190115	050843.8	OT	42344		1	1	2.16.124
werwerw 645645 20190114 M 1 20190114 111259.1 OT 456456 1 1 2.16.124.	Tanna	PAT				20110411	222002.2	SR			1	1	1.2.840.1
	werwerw	645645	20190114	M	1	20190114	111259.1	OT	456456		1	1	2.16.124
			20190114	м	1	1120022-010			456456			1.7	



Once the search criteria are set click "Search". Clicking "Search" with no search parameter set will list all the existing studies. This is not recommended and it may take a very long time.

Search also can be started by pressing "Enter" in any text box in the Advanced Search area.

On screen opening query will be sent to the default Storage server (one currently selected in the settings screen) but you can switch to another server by selecting it from the list located under search panel

Double click on the row from the list of results or select the row and click "Next" – the matching DICOM files will be stored in the destination folder and then displayed in the <u>DICOM viewer</u>.

Right click on the row opens menu allowing to copy/print patient and study info, add a new series to an existing study or execute some custom action using selected data ("Query action" in the below image):

Study Date	Study Time	Acc#	Ref. Phys. Name	
2015-09-20	06:55:27	от		
2015-09-20	07:33:45	от		
2015-09-20	07:35:53	от		
2015-08-28	16:15:10	от		
2015-09-00	Print Patier Patient Info	) to Notepac /report as n	1	

How to configure Customs Actions.

### 5.5. Burn CD/DVD

MODALIZER+ allows creating a complete and portable medical record with specific studies and reports, and an embedded DICOM Viewer.

Select "Create DICOMDIR" from the main screen.



In order to prepare a Standard DICOM Media, MODALIZER+ prepares the media files using standard filenames in Patient-Study-Series-Image hierarchy and creates a DICOMDIR file.

MODALIZER+   Create DICOMDIR				- 🗆 🗙
CREATE DICOMDIR				
1 Source Folder				Browse Scan
Patient Name	Patient ID	Num. of Studies	Num. of Series	Num. of Images
Rename and arrange DICOM files and create DICOMDIR in place				
O Copy, arrange and rename DICOM files to a new folder				
<ul> <li>Just Create DICOMDIR (not recommended)</li> </ul>				
■ Include DICOM Viewer to DICOMDIR ✓ Anonymize ■ Remove Private Tags				
Destination Folder				Browse
🛞 <u>Cancel</u> 🧩 <u>Settings</u>			Back	⊖ <u>Next</u>

The "Create DICOMDIR" screen consists of two areas:

- Part #1:
- Source Folder click "Browse" to select the folder with files to burn
- Study Details Table click "Scan" to verify the study's details (if no valid DICOM files found no details will be presented)
- Part #2:

Select the appropriate option from the list:

- Rename and arrange DICOM files and create DICOMDIR in place the original DICOM files will be renamed according to the standard and arranged hierarchically and DICOMDIR file will be created in the root folder.
- Copy, arrange and rename DICOM files to a new folder the DICOM files will be copied and arranged hierarchically and DICOMDIR will be created in the folder that you define.



- Just create DICOMDIR (Not recommended) this option only create DICOMDIR file in the same folder with DICOM files. If the filenames are not according to the standard, they will not be renamed. This option may not comply with all the standard requirements.
- Destination Folder define the destination folder for the option "Copy, arrange and rename DICOMDIR in folder"

#### Notes:

- In order to include the Viewer of MODALIZER+ to the created DICOMDIR check the option "Include DICOM Viewer to DICOMDIR".
- In order to anonymize/de-identificate DICOM files in the destination folder check the option "Anonymize". This option is available only if " Copy, arrange and rename DICOM files to a new folder" was selected. Also you can select an additional option to remove all private tags (DICOM attributes that are not defined in standard, but are custom data specific for your organization)

Click "Next". Select the drive for the media to be burn. Click "Burn to disc" option.

## 6. Reporting

MODALIZER+ features two options for creating reports:

- 1. DICOM Structured Reporting (SR) The purpose of the DICOM SR specifications is to improve the documentation of diagnostic images by defining semantic reports that can both readable for software and also can be rendered for display. While this method is recommended by the DICOM standard committees, there's no option to control how the report will be displayed by the PACS. If preserving the looks of the report (such as font, colors, logo and other graphic features) is important to you, consider using DICOM Encapsulated PDF Report.
- Formatted Report Templates Create PDF reports using the standard DICOM Encapsulated PDF class definition. This option enables controlling the graphic design of the report. MODALIZER+ features a unique templates mechanism to automatically fill the case info into existing template documents.

## 6.1. Formatted Report Templates

Formatted Report Templates automates the process of filling the report with case attributes such as patient identification (e.g. Name, ID, Birth Date and Sex), study information and other attributes.

A report template is saved as RTF Document with placeholders for values that are automatically filled while following the new patient wizard. You can create your own templates and select from multiple templates depending on the performed procedure.



The special '\$' surrounded placeholders are automatically replaced by the actual attributes values for every new report. The following attributes can be used:

Patient Name	\$PatientName\$
Patient ID	\$PatientID\$
Patient Sex	\$PatientSex\$
Patient Birth Date	\$PatientBirthdate\$
Accession Number	\$AccessionNumber\$
Study Date	\$StudyDate\$
Study Time	\$StudyTime\$
Modality	\$Modality\$
Requested Procedure Description	\$RequestedProcedureDescription\$
Scheduled Procedure Step Description	\$ScheduledProcedureStepDescription\$
Station Name	\$StationName\$
Referring Physicians Name	\$ReferringPhysiciansName\$

Read more about how to configure the report templates.

## 6.2. DICOM Structured Reports (DICOM SR)

Create a DICOM Structured Report by typing text in the report text panel on "Acquisition" screen and selecting "DICOM SR" option in "Create report as" section on "Convert to DICOM" screen. DICOM file containing SR will added to a destination folder automatically as separate series. You can load report to Viewer, it will be displayed as HTML page.



## 7. The Local Archive

Local Archive is a built-in SQLite data base and hierarchically structured storage place (Root folder/Study folder/Series folder/DICOM files). All converted/retrieved from PACS DICOM files are stored in this storage place if "Use local archive" option is marked in Settings screen. You are able to search, view, export, delete stored files and add new DICOM files to an existing study using "Local Archive" screen.

See in "<u>Settings</u>" how to configure the Local Archive.

🕨 🕨 🕨	ced Sear	ch								Impo	<u>ort files</u>	<u>Search</u>
Patient name					Patient ID				Exa	ct study dai	te: <mark>15/10/2</mark>	019 🗸
Patient Name	Patient ID	Sex	Birth Date	Accession Number	Study Date	Study Descriptio	No of Series	No of Images	Status	Institutior Name	Modalities In Study	Body Parts
dgdfgdfgf^gdf	2234234	м		2342344	20191	DICOMI	1	1	New		от	
etrt^etert^^^	44645	F	20191	456456	20191	DICOMI	1	1	New		от	
111^111^^^	111	м		111	20191	DICOMI	1	1	New		от	
222^222^^^	222	F		222	20191	DICOMI	1	1	New		от	
333^333^^^	333	F		333	20191	DICOMI	1	1	New		от	
444^444^^^	444	F		444	20191	DICOMI	1	1	New		от	
555^555^^^	555	0		555	20191	DICOMI	1	1	New		от	
6666^6666^^^	666	М		666	20191	DICOMI	1	1	New		от	
7777^7777^^^	7777	м		7777	20191	DICOMI	1	1	New		от	
8888^8888^^^^	888	М		88888	20191	DICOMI	1	1	New		от	
999^999^^^	999	F		999	20191	DICOMI	1	1	New		от	
fghfg^fhfgh^^^	345345	F	20191	345345	20191	DICOMI	1	1	New		от	
dfgdfgfdg^dgd	345345	М		3535435	20191	DICOMI	1	1	New		от	
fhfqh^dhfdh^	45353	0		3453535	20191	DICOMI	1	1	New		от	

Select "Local Archive" from the main screen:

Default sorting of the result grid is by study date descending.

Additional search fields are available on opening expander:



	ced Sean	ch								Impo	ort files	<u>Search</u>
Patient name	:				Patient ID	:			Exa	act study dai	e: <mark>15/10/</mark> 2	019 🗸
Accession #	:					From stu	dy date:	15/10/2019	→ □	To study da	te: 15/10/2	2019 🗸 🗖
Institution name					Manala lina		.,	,,				
Institution name					Modality							
Study description					Body part	:				<u>C</u>	<u>lear S</u>	<u>earch</u>
Patient Name	Patient ID	Sex	Birth Date	Accession Number	Study Date	Study Descriptio	No of Series	No of Images	Status	Institutior Name	Modalities In Study	Parts
dadfadfaf^adf	2234234	м		2342344	20191	DICOMI		1	New		от	Evamin
etrt^etert^^^	44645	F	20191	456456	20191	DICOMI	1	1	New		от	
eur etert		м		111	20191	DICOMI	1	1	New		от	
111^111^^^	111						1	1	New		от	
	222	F		222	20191	DICOMI	1 ±					
111^111^^^		F F		222 333	20191	DICOMI	-	1	New		OT	
111^111^^^ 222^222^^^	222						1	1	New New			
111^111^^^ 222^222^^^ 333^333^^^	222 333	F		333	20191	DICOMI	1				от	
1110111000 2220222000 3330333000 4440444000	222 333 444	F F		333 444	20191 20191	DICOMI DICOMI	1 1 1	1	New		от от	

Once the search criteria are set click "Search". Double click on the row from the list of results or clicking the "Next" button will lead you to Viewer screen displaying images of the selected study.

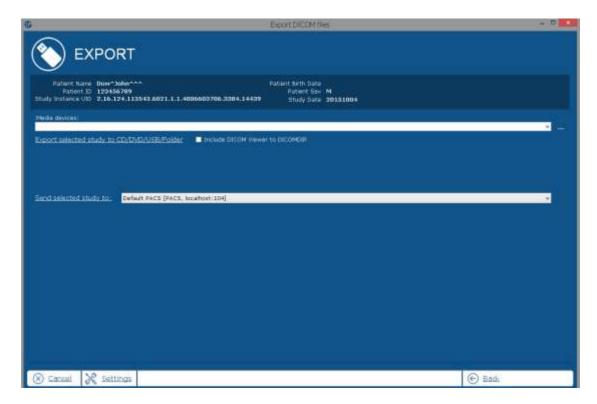
You can import DICOM files from the folder by your selection. To do it click "Import files" and select required folder. This folder will be scanned, valid files will be copied to archive folder and found studies will be entered into DB.

Right click on the row opens menu allowing to export/delete selected study or add a new series to it:

Patient ID		Sex	Birth Date					
123456789	Export Delete	l						
	Add imag	Add image/report as new Series						

Click on "Export' opens next screen:



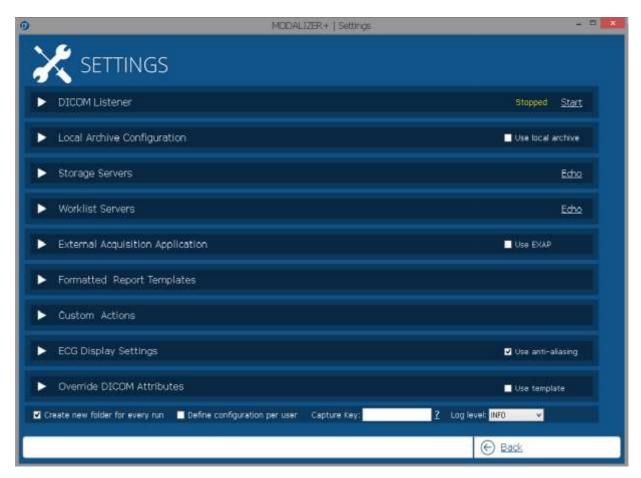


Here you can send images to the required PACS server or store them as DICOMDIR on external media (as DVD or Flash drive) or in some folder on your computer (about building DICOMDIRs see <u>Creating Standard DICOM CD/DVD Exports</u>)



### 8. MODALIZER+ Settings

You can enter the "Settings" screen by clicking the "Settings" link in the main menu or by clicking the "Settings" button in the bottom left corner of any screen. Here you can set the Listener, Storage and Worklist servers, configure Local Archive, Formatted report templates and Custom Actions, change the conversion process configuration and define how to display ECG files in the Viewer



The DICOM nodes (workstations, PACS systems) can communicate if they know each other. That means, each system must know the AE Title, the IP address or hostname and the IP port of the other system. After setting these parameters you will be able to use Storage, Modality Worklist and Query/Retrieve.



## 8.1. TLS (Transport Layer Security) Secure DICOM Networking

Certificates from Windows store can be used for secured DICOM connections to PACS.

Application can use certificates from Local Machine or Current User location (see Microsoft Management Console):



- 🔺 🖈 Certificates Current User
  - Personal
     Certificates
  - Trusted Root Certification Author
  - 🖻 🗀 Enterprise Trust
  - Intermediate Certification Author
  - Active Directory User Object
  - Trusted Publishers
  - Intrusted Certificates
  - Dirid-Party Root Certification Au
  - Trusted People
  - Client Authentication Issuers
  - Image: Second Second
  - MSIEHistoryJournal
  - Certificate Enrollment Requests
  - Smart Card Trusted Roots

See more detailed explanations about using certificates in Listener configuration and Remote Servers configuration sections.

## 8.2. DICOM Listener configuration

▼ DICOM Listene	er -	Stopped	<u>Start</u>	<u>Echo</u>
AE title: MODALIZE	RPlus Port: 5108 Start listener when application starts	🔲 Keep run	ning when liste	ner is on
Storage path: C:\Progra	mData\HRZ\LocalStorage\			
	✓ Use secure network	ine 🔍 Cur	rent User	
MODALIZER+ Certificate:	CN=HL7KitCertificate		<u>Browse</u>	<u>Clear</u>
	Certificate Verification 🛛 🔳 Request for Client Certificate (Mutual	Authenticati	on)	
Approved clients:			Add	



MODALIZER+ can receive DICOM files sent from another applications id if its built-in DICOM Listener is started. Current listener status is displayed in the right upper corner of the Listener tab.

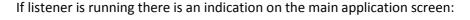
First set your listener AE Title and port. You can always start/stop listener by clicking "Start"/"Stop" button next to status label.

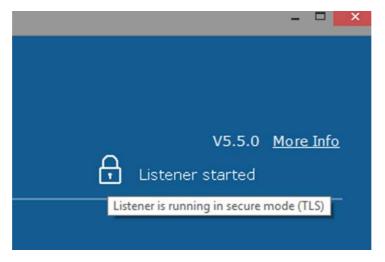
To change folder where listener stores received files - click "Browse" button.

When "Use local archive" on Local Archive configuration tab is selected:

- a. Local Archive folder will be used as listener Storage path and "Browse" button will be disabled.
- b. Info about all DICOM files received by listener will be inserted to DB automatically

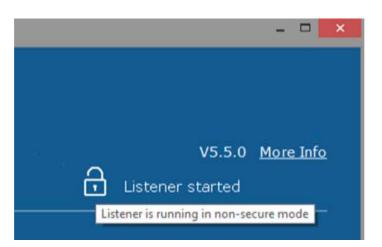
You can decide to start listener each time when MODALIZER+ starts by marking "Start listener when application stars" checkbox.





In case "Use secure network" is not selected indication will be like:





If you want to minimize MODALIZER+ to tray on closing application by "X" (so that listener keeps running) - mark "Keep running when listener is on" checkbox. To restore MODALIZER+ to view - right click on tray icon and select "Open". To exit MODALIZER+ which is collapsed to tray - right click on tray icon and select "Exit"

NOTE: If one MODALIZER+ instance is already running, all other instances you'll try to start will be opened in "Viewer only" mode. In such case check for another MODALIZER+ instance collapsed to the system tray.

Checkbox "Use secure network" - if selected enable DICOM TLS Network Security Layer

"Windows Certificate store" area - select required store (Local Machine or Current User)

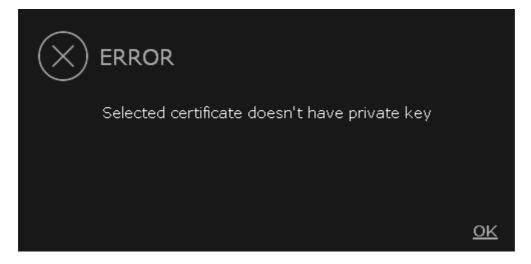
"MODALIZER+ Certificate" area - click "Browse" to select certificate that identifies MODALIZER+ from Windows store:



Select certi Please check t	ficate hat certificate has private key	
<b>?</b> =	Issuer: Go Daddy Root Certificate Authority - G2 Valid From: 03/05/2011 to 03/05/2031	^
	<u>Click here to view certificate</u> properties	
	Go Daddy Root Certificate Authority - G2	
<b>श</b> ≡	Issuer: Go Daddy Class 2 Certification Authority	
	Valid From: 01/01/2014 to 30/05/2031	
<u>[]]]</u>	MySslClientCertificate	
<b>₩</b> ≡	Issuer: MySslClientCertificate	
	Valid From: 01/01/2015 to 01/01/2025	
	HRZ Software Services LTD	
<b>?</b> =	Issuer: Go Daddy Secure Certificate Authority - G2	
	Valid From: 23/11/2016 to 21/11/2017	
[]	HL7KitCertificate	
!≋≣	Issuer: HL7KitCertificate	
	Valid From: 26/07/2018 to 26/07/2019	
·····	NVIDIA GameStream Ser∨er	
₽≡	Issuer: NVIDIA GameStream Server	
	Valid From: 08/03/2019 to 08/03/2039	
	IIS Express Development	
<b>≌</b> ≣	Certificate	
·	Issuer: localhost	
	Valid From: 19/08/2018 to 19/08/2023	~
	ОК	Cancel



If user selects certificate which doesn't have private key, next message will be shown and certificate will not be selected:



Click "Clear" to remove selected certificate from settings.

Checkbox "Certificate Verification" - if checked listener will ask clients to provide a certificate

Checkbox "Request for Client Certificate (Mutual Authentication)" - when disabled the clients are not asked to identify ???

"Approved clients" textbox - list of all certificates belonging to the listener clients. User must get clients certificates as files and import them into Windows Store using Microsoft Management Console.

Click "Add" to select certificate from the list, click "Clear" to remove ALL client certificates.

## 8.3. Local Archive configuration

All converted/retrieved from PACS DICOM files can be stored in hierarchically structured storage place (Root folder/Study folder/Series folder/DICOM files); info about these files is stored in built-in SQLite data base. To use this option, mark "Use local archive" checkbox on the "Local Archive Configuration" tab.

Cocal Archive Configuration	🗖 Use local archive
Automatically Delete local copy of study after: One Month v copy of study only if: Committed Successfully v	
Automatically send storage commit requests for new studies	import files
Local Archive Folder: C:\ProgramData\HRZ\LocalStorage\	Browse Rebuild from files



To change root folder where archived studies are stored - click "Browse" button.

Set required clearing mode by selecting options from "Automatically delete local copy of study after" and "Automatically delete local copy of study only if" lists.

You may need to re-fill DB by info about DICOM files stored in root folder, for example if you want to switch to another storage folder. You can do it by selecting required path and clicking "Rebuild from files" button. Current archive folder will be scanned and found studies inserted into DB. This operation is executed in separate task with displaying its progress while running. You can stop this operation by clicking "Cancel" button. Log file RebuildFromFiles.log will be created containing follow data:

- The name of every folder that is scanned
- The name of every file that is opened (full path)
- Whenever new study is added with Study Instance UID.

You can also import DICOM files from the folder by your selection. To do it click "Import files" and select required folder. This folder will be scanned, valid files will be copied to archive folder and found studies will be entered into DB.

#### 8.4. Storage Servers configuration

V Storage Servers		Esh	2
	Timeout (sec.): 10	Show servers selection	on
Default remote: JDICOM [JDICOM, localhost:5184]	v Edt	Add new Delete	

Note: You should configure at least one server.

- First set your Local Application Entity Title:
  - Local AE The DICOM AE Title of this installation of MODALIZER+.
     This must match to the MODALIZER+ AE Title configured in the PACS.
  - Local port define the port number that MODALIZER+ listens on for incoming connections (The default port is 5108)
  - Timeout the purpose of a server timeout is to prevent from endlessly waiting for a server to respond. The recommendation is to keep the default, if there are known connection problems increase the value.
- The next step is to define a new server. Click "Add new ":



			DSRS\	/C			
Remote AE	DSRSVC				Retrieve method	C-MOVE	<b>~</b>
Remote host	localhost				Remote port	104	
Description	DSRSVC						
Secure netw	ork 🔽 🗌	/indows (	Certificates sto	ore <b>c</b>	) Local Machine	O Curren	t User
Local AE Cer	tificate (optio	onal)				<u>Browse</u>	<u>Clear</u>
Remote AE C	ertificate (op	otional)				<u>Browse</u>	<u>Clear</u>
Verify	Remote Certi	ificate 🗌	1				
					<u>Echo</u>	<u>Cancel</u>	<u>Save</u>

Set the data for your Storage Server. Click the "Echo" button to verify that the settings are correct. If red X icon is displayed, verify that the settings are correct and the server is running. Click "Save" to apply the settings for a new Storage Server or "Cancel" to exit the settings. Check the log file lastEcho.log in MODALIZER+ installation folder (C:\MODALIZERPLUS).

"Retrieve method" combo box allows selection between using C-MOVE and C-GET. The user can select which of the commands to use for retrieving the instances.

"Windows Certificate store" area - select required store (Local Machine or Current User)

Local AE Certificate (optional - user don't have to select certificate. Not all servers require it) - click "Browse" to select local certificate from Windows store. Click "Clear" to remove selected local certificate. This certificate verifies MODALIZER+ identity. The remote AE may request for this (mutual authentication)

Remote AE Certificate (optional - user don't have to select certificate. If not defined MODALIZER+ will not verify the server certificate explicitly) - click "Browse" to select remote certificate from Windows store. Click "Clear" to remove selected remote certificate.

Checkbox "Verify Certificate" (enabled only when Remote AE Certificate is blank). When checked RZDCX will look for the remote certificate in the local user cert store



**Important:** To complete this step you must also configure your Storage Server (PACS) with Your MODALIZER+ AE Title (the value you set for "Local AE"), the hostname (or IP address) of your computer and the IP port (the value you set for "Local port").

<u>Note #1:</u> Ask your System/PACS Administrator for the Storage Server parameters.

<u>Note #2:</u> MODALIZER+ is compatible with most DICOM PACS providers. Please advise your PACS software help file about AE configuration of your PACS server or ask your System Administrator.

#### 8.5. Worklist Servers configuration

The Worklist Server must be configured in order to use Modality Worklist query.

▼ Worklist Servers	<u>Echo</u>
Local AE: ModalitySCU	Timeout (sec.): <mark>5</mark> ✔ Show servers selection
Default worklist: DSRSVC [DSRSVC, localhost:104]	Edit Add new Delete
Worklist Query Filter: 🔲 For today 🔲 For this AE 🗹 Two step verificat	tion Modality: 🗸

Configure the parameters for your Worklist Server. Click the "Echo" button to verify that the settings are correct. If red X icon is presented verify that the settings are correct and the server is running. Click "Save" to apply the settings for a new Storage Server or "Cancel" to exit the settings.

Timeout - The recommendation is to keep the default, if there is known connection problem increase the value.

Two more options in the Worklist Server panel refer to Worklist Query filter. You can define that the search results will present only the studies that scheduled for today and/or for a specific Scheduled AE Title. To do this mark the appropriate check-boxes in the "Worklist Server" panel.

"Two step verification" checkbox: if this option is selected (by default its value is true) - all the data from the selected MWL entry will be displayed in a popup modal windows before starting the procedure.



	DSRSVC
Remote AE	DSRSVC
Remote host	localhost Remote port 104
Description	DSRSVC
Automatic Mi	PPS 🔲 Storage server 🗸 🗸
Secure netwo	ork ✔ Windows Certificates store O Local Machine O Current User
Local AE Cert	tificate (optional) <u>Browse</u> <u>Clear</u>
Remote AE C	ertificate (optional) <u>Browse</u> <u>Clear</u>
Verify	Remote Certificate
	<u>Echo</u> <u>Cancel</u> <u>Save</u>

See "Storage servers configuration " about Remote server and security settings.

Checkbox "Automatic MPPS" - select if you want MPPS to be sent with the completed study.

<u>Note:</u> Don't check this option if the Worklist Server you work with doesn't support MPPS.

"Storage server" list allows to select one the remote servers defined in MODALIZER+ as default destination to send study created from the Modality Worklist.

<u>Note:</u> Ask your System Administrator for the Worklist Server parameters.



## 8.6. External Acquisition Application

#### configuration

User has an option to use some external application to acquire images for converting to DICOM. For example - some application receiving images from medical device as CT etc. This application must receive as input parameter path to some "exchange data" file containing patient data (name and ID) and save acquired file in the parent folder of this file.

To use this option follow parameters have to be defined in Settings screen:

V External Acquisition Application			Use EXAP
Path to executable	: BuiltInEXAP.exe	<u>Browse</u>	<u>Reset to built-in</u>
Shared Folder:	C:\ProgramData\HRZ\EXAP	<u>Browse</u>	

- Path to executable: full path to EXE file starting external application (by default it is built-in example working exactly as Acquisition screen). To select EXE - click "Browse" button in the same line. To return to built-in example - click "Reset to built-in" button
- Shared folder: full path to a folder in which exchange file (XML, txt, json etc.) will be stored. To select folder click "Browse" button in the same line.

In order to use EXAP - select "Use EXAP"

When "Use EXAP" is selected - external application will be started when user clicks "Next" button on "New patient"/ "Modality Worklist" screen or on adding new series to existing study from "Local Archive'/"Query Retrieve" screen.

MODALIZER+ will fill the exchange file with case attributes such as patient identification (e.g. Name, ID, Birth Date and Sex), study information and other attributes.

Template file (located in MODALIZER+ installation folder and named **PatientDataTemplate.xml**) can be of any text format - XML, txt, json, even RTF. By default it's XML containing ALL available fields:

<?xml version="1.0" encoding="utf-8" ?> <PatientData> <PatientName> \$PatientName\$ </PatientName> <PatientId> \$PatientID\$ </PatientId> <PatientSex> \$PatientSex\$

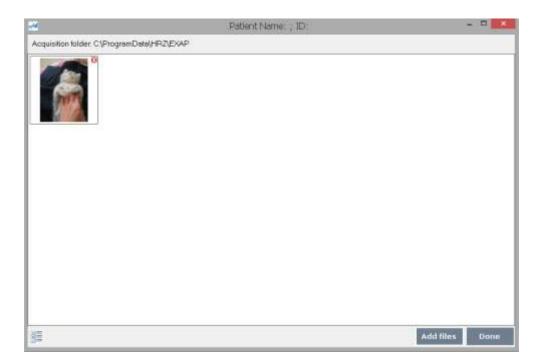


</PatientSex> <PatientBirthdate> \$PatientBirthdate\$ </PatientBirthdate> <AccessionNumber> \$AccessionNumber\$ </AccessionNumber> <StudyInstanceUID> \$StudyInstanceUID\$ </StudyInstanceUID> <StudyId> \$StudyId\$ </StudyId> <StudyDate> \$StudyDate\$ </StudyDate> <StudyTime> \$StudyTime\$ </StudyTime> <Modality> \$Modality\$ </Modality> <RequestedProcedureDescription> \$RequestedProcedureDescription\$ </RequestedProcedureDescription> <ScheduledProcedureStepDescription> \$ScheduledProcedureStepDescription\$ </ScheduledProcedureStepDescription> <StationName> \$StationName\$ </StationName> <ReferringPhysiciansName> \$ReferringPhysiciansName\$ </ReferringPhysiciansName> </PatientData>

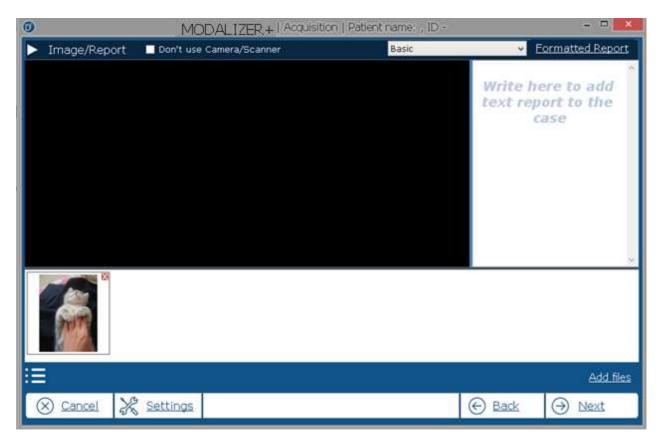
Output file is saved as PatientData.xml in the shared folder so your EXAP application is able to load required data from it. The special '\$' surrounded placeholders are automatically replaced by the actual attributes values for every new exchange file.

MODALIZER+ is installed with built-in EXAP application as example:





After user added files and clicked "Done" (or executed custom actions in external application and closed it) - "Acquisition" screen will be opened with acquired files added to the list:





#### 8.7. Formatted Report Template configuration

About formatted reports structure see <u>Reporting</u> section.

▼ Formatted Report Templates					
Template Name	Path				
Basic	BasicReportTemplate.rtf				
Aasds	C:\DICOMIZER\BasicReportTemplate.rtf				
	<u>Edit Add new Delete</u>				

Select required template in the list and click "Edit" to edit the template properties:



You can change templates name which is displayed in the list of templates on "Images" screen, select another RTF file or open RTF file itself to edit its content by clicking "Edit template" button (you can edit the header/footer of the template, edit text and add Logo).

If you want to create a new template - click "Add new" and select path to your custom RTF file.

To delete existing template - select it in the list and click "Delete"

NOTE: At least one template must exist so you cannot delete last one.



#### 8.8. Custom Actions configurations

"Custom Action" is a some operation you can execute using data from one MWL entry (see <u>Modality Worklist Query</u>) or Query entry (see <u>Query/Retrieve - Searching the PACS</u>)

▼ Custom Actions					
Start from	Title	Command		Replace Params	
Modality Worklist	test	C:\Temp\TestReportTemplate.rtf		✓	
Query Retrieve	Query action	some.exe			
			<u>Edit Ad</u>	<u>d new Delete</u>	

To create new custom action click "Add new" button:

	New custom action	
Start from	Modality Worklist	¥
Title		
Command		<u>Browse</u>
Replace parameters	s 🔤	
	<u>Test</u> <u>Ca</u>	ancel <u>Save</u>

Select a screen where you want to see new action (Modality Worklist or Query Retrieve), give action a title which will appear in the list and define some command you want to execute - path to some file (as .TXT, .RTF, .EXE or .BAT).

Mark "Replace parameters" checkbox to make application replace predefined parameters inside command file by data from MWL/Query (as in <u>formatted report</u>)

When you select custom action from the row on MWL/QUERY screen - defined file will be opened (with replaced parameters if needed) as separate system process.

To edit existing custom action - select it in the list and click "Edit" button.

To delete existing custom action - select it in the list and click "Delete" button.

You can test your action by clicking "Test" button (parameters will be replaced by some random data).



Types of the custom action:

1.Start EXE without parameters.

 Open document template , TXT or RTF for example, containing placeholders (\$PatientID\$ etc.) to replace (like formatted reports). Place holders will be replaced, files stored in [MyDocuments]\MODALIZERPLUS\ACTIONS folder and opened as separate process (Notepad, Word etc.)

3. Start EXE with parameters. To pass parameters to EXE you need to do follow:

- a. Create batch file containing path to your EXE and parameters, for example MyCustomAction.bat file which content is
   "C:\MyFolder\EXE.exe \$PatientID\$ \$PatientName\$"
- b. Select MyCustomAction.bat as you custom action.
- c. Select "Replace parameters" check box.

#### Available parameters are:

\$PatientName\$
\$PatientID\$
\$PatientSex\$
\$PatientBirthdate\$
\$StudyDate\$
\$AccessionNumber\$
\$StudyTime\$
\$Modality\$
\$RequestedProcedureDescription\$
\$ScheduledProcedureStepDescription\$
\$StationName\$
\$ReferringPhysiciansName\$



#### 8.9. Override DICOM Attributes

DICOM attributes are stored in the files that you can edit or replace. In order to use the attributes as they're defined in the template mark "V" in the check-box "Use Template".

Application allows to define not only one template common to all converted DICOM files, but also specific templates for each type of such files.

There is combo box "Type" in "Override" section:

A CONTRACTOR OF THE OWNER		and the second se	h to template file: D:\Temp\template.dom put in the created sbjests (overridet anything shee)		Browse New
earc v	PDF	Nares		1i# : [	· · · · · · · · · · · •
	renum	Tag name	Value	Length	VR
(000	(0800,80	InstitutionName	Test	4	LO
(001	18,0015)	BodyPartExamined	Lungs	6	CS

"Common" template (if defined) will be inserted into each converted DICOM file.

There are also four other types: Image, PDF, Video and Structure Report templates which will be inserted only to relevant files.

Any of the files can be created/selected separately.

**Important!** The override attributes are applied after all other conversion steps were made. Make sure not to override any image attributes (group 0028).

To create your own DICOM attributes template click "New", in the opened window select the file location and give it a name. Click "Save". The created file will be automatically loaded in MODALIZER+ and you can edit the attributes. You can find the attribute by its name - start typing to get a drop-list of the appropriate attributes or search by the attribute's tag enumeration. Click "Add" to present the value in the table. Enter the new value in the attribute's row in the "Value" column. Clicking "X" in the left column will remove the attribute from the template.

If you want to use another DICOM attributes template click "Browse" and select.



## 8.10. ECG Display Settings

See <u>Displaying ECG in Viewer</u>.

## 8.11. Misc configuration

At the bottom of the configuration screen there are few additional options:

✔ Create new folder for every run	🔲 Use unicode character set	Capture Key:	?
Define configuration per user	Log level: INFO 🗸 🗸		

## 8.11.1. File System Directory

## Organizations

Create new folder for every run - in this way each study will be stored in separated folder (Recommended).

When Local Archive is disabled the converted images destination folder can be manually set (see <u>New Patient</u>).

When "Create new folder" is enabled, every study is stored in a newly created directory.

## 8.11.2. Support of the Unicode character

#### set

When "Use unicode caharcter set" is checked, values of "String" tags (Value Representation SH, LO, ST, LT, UT, PN) will be inserted encoded as Unicode.

## 8.11.3. Per-User Configuration

When per-user configuration is checked, every user (from the windows operating system) has its own configuration file.

## 8.11.4. Capture Key

Define key combination to capture image from the currently selected TWAIN/WIA device when in the capture screen

- 1. click inside the "capture key" text box
- 2. Hold the keys combination to use for image capture.

Valid keys:

- Combinations of control/alt/shift keys and characters (Ctrl-A, Alt-Z, Ctrl-Shift-F etc.)
- The function keys (F1, F2, ...)

Enter/Return and Space keys are not recommended as they may interfere with standard UI functionality.

To disable the capture key, click in the text box and then press the delete key.



# 8.11.5. DICOM Log level for operations as "Send ECHO", "Get Query" etc.



Default value is "INFO"



## 9. Completing tasks with MODALIZER+

#### 9.1. Viewing DICOM Images

MODALIZER+ is a powerful DICOM Workstation that lets you display DICOM Files from your local computer, from CD/DVD/USB and from any PACS.

There are a few ways to present the files - you can Drag-and-drop the items or to click "Open Files" to browse for a folder and select the files to view. In order to present all folder's content use "Open Folder" button.

#### 9.2. Using CD/DVD DICOM Viewer

DICOMZIER automatically adds a DICOM CD Viewer to every burned CD/DVD so patients and physicians can view their studies and reports anywhere. Double click the DICOM Viewer application in the CD/DVD root folder to view the CD/DVD content.

#### 9.3. Viewing PDF file in DICOM format

To extract a PDF from a DICOM Encapsulated PDF file, click PDF icon in the Viewer – the file will be converted to PDF and displayed using your system default PDF viewer.

## 9.4. Attaching scanned documents to the patient folder

MODALIZER+ will automatically identify compatible camera or other imaging device connected to your computer. If there are more than one device connected choose the one you'd like to use through the drop-list in the upper left corner of the Image/Report panel.

Capture an image by clicking on the red button. The icon of the captured image will be presented in the panel below the Image/Report panel.

## 9.5. Sending the same study to multiple destinations

Once an operation is completed you can send a copy of your study to others DICOM applications by using the "Send to" option in the operation completed screen. Select the destination from the drop-list next to the "Send to" button. If the destination DICOM application is not in the list, enter settings and add new <u>Storage Server</u>.

### 9.6. MPPS (Modality Performed Procedure Step)

Modality Performed Procedure Step is a complementary service to Modality Worklist.

Once the procedure was started via Modality Worklist Query the modality creates a new MPPS that references the Study.



MPPS has 3 statuses:

- IN PROGRESS this means that the procedure has been started
- COMPLETED this means that the procedure is finished.
- DISCONTINUED if the procedure was stopped in the middle

### **10.** Troubleshooting

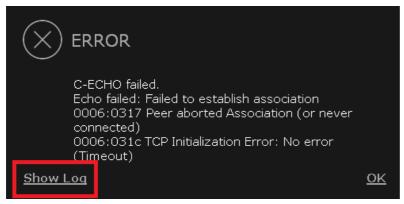
#### 10.1. Log Files

MODALIZER+ Log files are stored in the directory: C:\Users\<User>\Documents\ MODALIZERPLUS \LOGS.

MODALIZER+ keeps the last log for every DICOM operation:

- LastEchoToStorageServer the log on Echo to PACS action
- LastEchoToWorklistServer the log on Echo to Worklist Server action
- LastMove the log on copying a study to PACS
- LastMPPSCreate the log on MPPS creation
- LastMPPSSet the log on setting MMPS
- LastQuery the log on Query Retrieve operation
- LastSend the log on the send to PAXS operation
- LastWorklistQuery1 the log on Worklist Server search operation

When operation fails, message will be displayed with an option to open correspondent Log file:



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## **Appendix A**

## How to start MODALIZER+ from command line with parameters

When launched with specified command line parameters MODALIZER+ will start directly in the Q/R screen and send a query according to the parameters. Query parameters appear in the query screen when results are retrieved from PACS and could be editable for additional query.

Also there is command line parameter allowing to get "snapshot" of the current image from the MODALIZER+ viewer.

**Command Line options** 

-q or -Q	Start MODALIZER+ in the query screen and send a Query.
-o or -0	Set the output path for Send as references. This option overrides the EXAP shared folder name.

#### Query parameters

0 or more query parameters can follow the -Q option. Every parameter should be of the form:

tagName="value"

Double quotes are optional for cases where the value contains whitespace characters (space).

The allowed tags are all the ones that are displayed in the Q/R screen including the advanced search. The tag names should be according to RZDCX's DICOM\_TAG\_ENUM.

Option	Tag Name	Тад	Comments and examples
patientName	Patient Name	(0010,0010)	
patientId	Patient ID	(0010,0020)	
PatientBirthDate	Patient Birth Date	(0010,0030)	Exact date in DICOM format (YYYYMMDD) Example: "20170821"
PatientSex	Patient Sex	(0010,0040)	Valid Values: M/F/O or Male/Female/Other (both accepted).
AccessionNumber	Accession Number	(0008,0050)	
StudyDate	Study Date	(0008,0020)	Exact date in DICOM format



			(YYYYMMDD) including ranges. When value is a date range double quotes must be used to prevent parsing it as command line option. Examples: "20170821" (exact date) "-20170821" (to date). "20170812" (from date). "20170812-20170911" (date range)
ModalitiesInStudy	Modalities in Study	(0008,0061)	

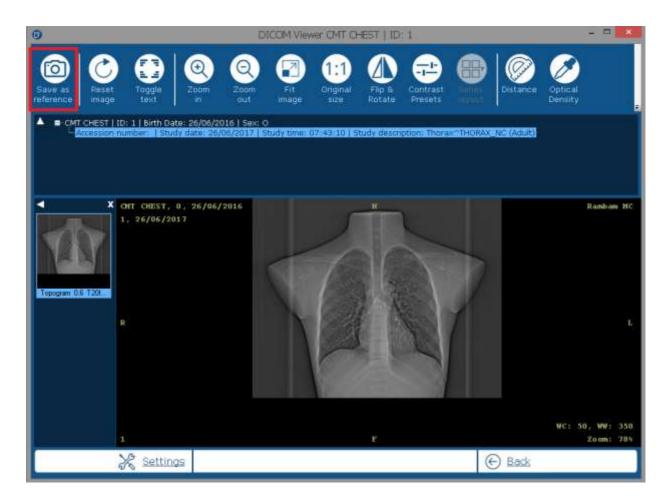
Example: MODALIZERPlus.EXE -q patientId="ID15031" will start the directly to the Q/R string and start a query:

OUTERY RETRIEVE         Advanced Search         Patient name:         Patient name:         Patient ID:         ID15031         Study date:         Patient ID:         C_VUSers_EvgenVa@VDocuments_VDICOMIZERVAECETVED         Destinition Folder	arsb
Patient ID: ID15031 Study date: 24/01/2019	ercb
Patient ID: ID15031 Study date: 24/01/2019 -	
Destinition Folder C:\Users\Evgenvall\Documents\DICOMIZER\RECEIVED DSRSVC [DSRSVC, localhost: 10-	
	11 (
Studies list (to retrieve selected study double-click on the row or select row in the grid and click "Next")	
Patient Patient Birth Sex Study D Study Study Mod In Acce Mer Phys. #Series #Inst In	tudy histarice 1D
	2.124.

#### Send as reference button

When the -O command line parameter is used, the Send as reference button shall be displayed instead of the three buttons on the left (open file, open folder and history) :





Clicking the "Send as reference" button will save the currently displayed and selected image using the current VOI LUT to the path provided as the value of the option. For example if the MODALIZER+ started with the command: *MODALIZERPlus.EXE -O "c:\taken Send as references"* then the files will be saved in *"c:\taken Send as references"*.

The Send as references will be saved in PNG format in the full resolution of the DICOM image (i.e. according to the Rows and Columns tags (0028,0100) and (0028,0101).

Next to the PNG file, the original DICOM file will be saved:

The Send as reference save files will have the following filename pattern: <destination-folder>\SOP Instance UID.png <destination-folder>\SOP Instance UID.dcm

<destination-folder> is the value from the -O command line parameter. If -O is not set, application uses the EXAP shared folder from configuration.



If the provided path is not empty, and there is already a file with that name, the file shall be replaced without asking the user.

Start MODALIZER+ with "-help" or "-h" parameter to open popup windows with the description of command line parameters.