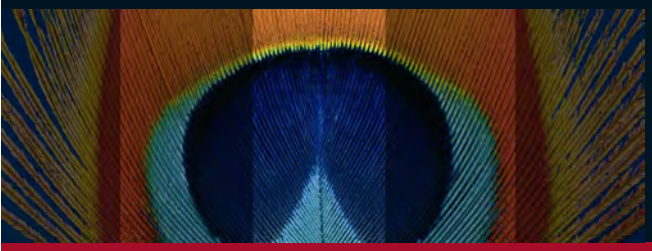

SPECTRALIS®

Viewing Module
Software Version 5.8

XML Data Export Interface

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Contents

1 Introduction

1.1 Purpose

This document describes the interface provided by the SPECTRALIS software to export SPECTRALIS data and information to a third party application.

1.2 Changes

1.2.1 Changes in SPECTRALIS Software Version 5.3

- New tag <SWVersion> added to tag <Body>
- New tags <ProgID>, <ReferenceSeries>, and <OCTFieldSize> added to tag <Series>
- New tag <AQMVersion> added to tag <GeneralEquipment>
- New tag <ValidPixelPercentage> added to tag <Zone>
- New tags <EDI> and <PositionWithinTolerance> added to tag <OphthalmicAcquisitionContext>.
- Tag <ThicknessGrid> updated. More than one instance of this tag is possible now.
- New configuration key “Anonymize”
- New configuration key “XmlDecl”

1.2.2 Changes in SPECTRALIS Software Version 5.6

- Support of anterior segment images and MultiColor images
- New tag <ReferringPhysician> added to tag <Study>
- New tag <ExaminedStructure> added to tag <Series>

1.2.3 Changes in SPECTRALIS Software Version 5.8

- Changed tag <ImageData> of tag <Image> to be optional, added configuration
- New tag <PatientUIDList> added to tag <Patient>
- New tag <StudyUID> added to tag <Study>
- New tag <SeriesUID> added to tag <Series>
- New tag <SeriesUID> added to tag < Reference Series>
- New tag <StudyComment> added to tag <Study>
- New tag <SeriesComment> added to tag <Series>
- New tag < ExportType> added to tag <Body>
- New tag < Laterality> added to tag <Series>

1.3 Definitions, Acronyms

Table 1: Definitions, Acronyms

HEDX	Heidelberg Engineering Data Export
HEYEX	Heidelberg Eye Explorer
HRA	Heidelberg Retina Angiograph
OCT	Optical Coherence Tomography
cSLO	Confocal Scanning Laser Ophthalmoscope
XML	Extensible Markup Language
PMB	Papillo-Macular Bundle
ETDRS	Early Treatment Diabetic Retinopathy Study

2 Requirements

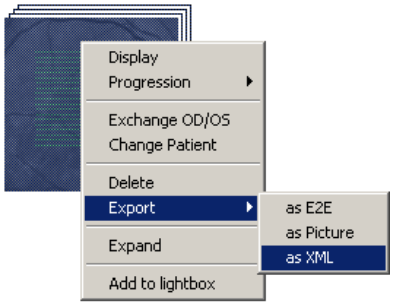
- This functionality is available in the SPECTRALIS version 5.8 or higher.
- The function is available for cSLO and OCT images, as well as for images imported by the Image Capture module. The XML export function is accessible via the right-click context menu on the image thumbnails in the image viewing window.

  Important note: To activate this function, at least the empty section `[XmlExport]` must be defined in the file hraviewer.ini (default location C:\HEYEX\plugins) or via the XML Data Export preferences for the hraviewer plugin in the Heidelberg Eye Explorer application. For more details see chapter “Configuration”.

3 Starting the Data Export from HEYEX

3.1 Starting the Data Export

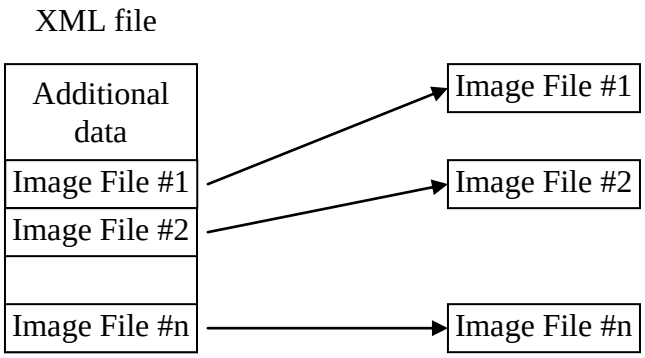
To launch the data export, select any number of cSLO or OCT thumbnails in the image viewing window and right click one of the selected thumbnails. From the context menu select ***Export → as XML***.



3.2 Communication Protocol

When the user launches the "Export as XML" command from the HEYEX context menu, HEYEX performs the following steps:

1. It exports the images of the selected exams into a pre-configured directory. The data format of these files is detailed in chapter "File Formats".
2. It creates an XML file referencing the location of the exported files, as well as additional information (see chapter "Data Format") in the same pre-configured directory.



3. It launches a configurable third party application, passing the path to the formerly generated XML file, with the following command line:

   `<3rd Party>.exe <XML file>`

   <3rd Party> is the name of the application's executable, and <XML file> is the full path to temporary XML file.

Notes:

- If not configured explicitly, HEYEX assumes that the directory of the application's executable is indicated in the PATH environment variable during the installation procedure.
- The names of the XML file, and the images files are unique each time the "Export as XML" command is launched (e.g. randomly generated). This avoids overwriting a previously generated file the third party application may still be reading.
- HEYEX does not wait for the third party application to terminate. It returns immediately after launching it, so that it is possible for the user to work with both HEYEX and the third part application at the same time.
- HEYEX does not delete the files it has created during the export procedure. It is the responsibility of the third party application to cleanup all data files created by HEYEX after the application has finished its work.

When the third party application is launched, it can for example, perform the following steps:

1. It can read and interpret the XML file.
2. It can process the image files referenced in the XML file (e.g. it can move them to another location).
3. It deletes the files from the directory to which HEYEX exported them.

4 File Formats

The images (cSLO images, B-Scans etc.) can be exported in multiple graphics file formats. The file format can be configured via the hraviewer.ini file or in the XML Data Export preferences of the hraviewer plugin (see chapter “Configuration”). The following file formats are available:

Table 2: Image file formats

Format	Description
TIFF	24-bit TIF format. These files are compressed with lossless LZW compression.
BMP	24-bit Standard Windows bitmap format. These files are uncompressed.
JPEG	JPEG file format at a compression rate of 100%.

The number of exported image files depends on the image type:

- Single images are exported as one file per image.
- Stereo images are exported as two separate files per stereo image.
- Images taken simultaneously are exported as two separate files per simultaneous image.
- Movies are exported as a set of files.
- Z-scans are exported as a set of files.
- OCT images are exported as one file per B-Scan and one file for the associated cSLO image.

5 Information passed along with images

5.1 Information passed for each patient

- Patient ID (as stored in the HEYEX database)
  Note: This is the internal patient ID stored in the current HEYEX database. Patients stored in different HEYEX databases can have the same ID.
- A user-defined Patient ID
- Patient's last name and first name
- Date of birth
- Sex
- A user-defined comment

5.2 Information passed for each study

Note: The term "study" used in the following corresponds to an "examination" in HEYEX. It can be considered as a visit.

- Study number (as stored in the HEYEX database)
  Note: This is the internal visit ID stored in the current HEYEX database. Having the same ID for visits stored in different HEYEX databases does not matter.
- Visit date
- Operator's name
- Referring physician's name
- A user-defined comment

5.3 Information passed for each image

- Eye laterality (left/right)
- Image modality (RF, IR, FA, AF, ICG-A, MC or OCT)
- Number of seconds after injection (for angiographies)
- Image type (e.g. Single, Left-hand image of a stereo pair, Right-hand image of a stereo pair, Movie or Z-scan)
- Gain value, and whether the gain was automatically or manually set
- Physical width and height of a pixel (in mm)

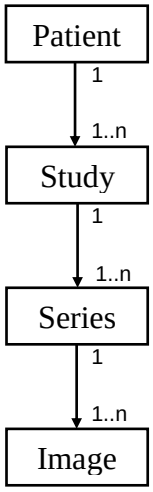
Additional capture parameters:

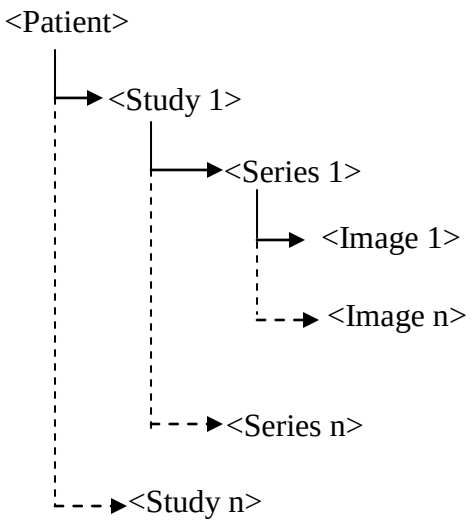
- For cSLO images:
  - Horizontal field of view
  - Resolution
  - Number of frames, if the image is the average of several frames
  - Function target
- For OCT images:
  - Pattern used (evenly spaced lines/star pattern etc.)
  - Scan area or star size
  - Number of lines
  - ART Mean function used with how many scans per line
  - Resolution acquisition mode

6 Data Format

6.1 Data Organization

The data in the XML file is organized in the following hierarchical order:





6.1.1 Patient Level

The Patient level contains the identification and demographic information about the patient to which a study belongs. Because more than one study of a patient can exist, the patient level is the highest level (when all the information collected for a single patient collected in a HEYEX light-box is taken into account).

6.1.2 Study Level

The Study level is the most important level. A study is the result of a certain type of examination at a certain date. It represents a visit. The Study level contains series of one or more images, depending on the protocol defined for the examination (Single, Movie, Volume etc.). All the image data is collected together with the same study as the root. A single patient can have multiple studies (visits) if the data export is launched from the HEYEX light-box.

6.1.3 Series Level

Below the study level, all the series of images are collected. The Series level identifies the modality type creating the images (Angiography or OCT); the date/time when the series was made, and details about the examination type (Single, Movie, Volume etc.) and equipment used (HRA, SPECTRALIS etc.).
Series are always a collection of related images coming from a s*ingle modality*. The way images are grouped into series is *depending on their modality and exam type*. Various attributes identify the acquisition.

6.1.4 Image Level (optional)

The lowest level is the Image level. Each image contains acquisition and positioning information as well as the image data itself. The acquisition data information for the image depends on the type of modality and exam.

6.2 Data Definitions

The XML file containing the exported data information has the following general layout:

```
<HEDX>
    <HEAD>
    </HEAD>
    <BODY>
       <Patient>
          <Study>
             <Series>
                <Image>
                </Image>
             </Series>
          </Study>
       <Patient>
    </BODY>
</HEDX>
```

The following table describes the basic data types for the different XML tags used in the XML file.

Table 3: Data Types

Data Type	Description	Example
Element [1..n]	A composite data structure. If an Element can exist more than once, its multiplicity is indicated in brackets.	<Patient>...</Patient>
String	A character string.	...>This is a string</...
Integer	An integer value.	...>-1245<./..
Float	A floating-point value.	...>25.4</...
Boolean	A boolean value (“*true*” or “*false*”).	...>false</...
Date	A composite value defining a Date. <Date> <Year>*y*</Year> <Month>*m*</Month> <Day>*d*</Day> </Date> *y*, *m* and *d* are of type Integer.	...> <Date> <Year>2008</Year> <Month>6</Month> <Day>13</Day> </Date> </...

Data Type	Description	Example
Time	A composite value defining a Time. <Time> <Hour>*h*</Hour> <Minute>*m*</Minute> <Second>*s*</Second> <UTCBias>*b*</UTCBias> </Time> *h*, *m* and *b* are of type Integer, *s* is of type Float. UTCBias is optional. If present, the specified time is in "Coordinated Universal Time" (UTC) format and *b* specifies the difference, in minutes, between the local time and the UTC time. All translations between UTC and local time are based on the following formula: local time = UTC + bias	...> <Time> <Hour>13</Hour> <Minute>22</Minute> <Second>12.4</Second> <UTCBias>60</UTCBias> </Time> </... In this example, the local time is: 13:22:12.4 + 60min = 14:22:12.4
Coord	A composite value defining an X/Y coordinate. <Coord> <X>*x*</X> <Y>*y*</Y> </Coord> *x* and *y* are of type Float.	...> <Coord> <X>0.000</X> <Y>15.667</Y> </Coord> </...

The data structures/tags are described by substructure breakdowns in sub-tables of the following form:

Table 4: Substructures

Level	XML Tag	Description	Data Type	Requirement
Root element of a substructure.	Name of the tag.	Description of the tag's meaning.	Data type of the tag. The substructure of a tag of type Element is broken down into its elements in a separate sub-table.	Defines if the tag is a mandatory tag (M) or an optional tag (O).

The following table describes the different XML tags of the <HEDX> data structure.

Table 5: Tag Definition

Level	XML Tag	Description	Data Type	Req.
HEDX	HEAD	Includes commands and data (for future use)	Element	M
	BODY	Includes patient, study, series and image information.	Element	M

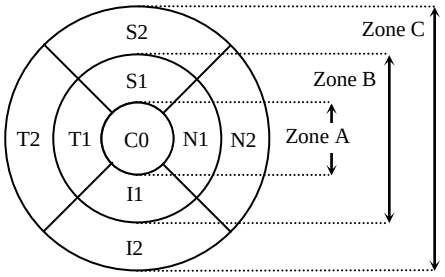
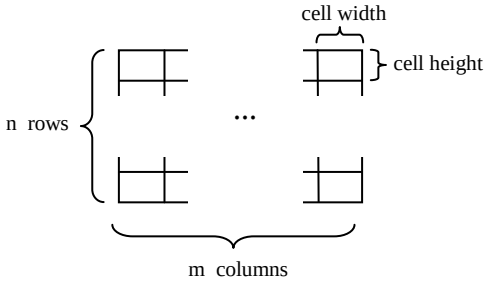
HEAD		Not used at the moment		

Level	XML Tag	Description	Data Type	Req.
BODY	ExportType	Defines the type of data the XML file is referencing. In case of the XML Data export, the value of this tag is “Data”.	String	O
	SWVersion	Version information about the software creating this XML file.	Element	M
	Patient	Contains Patient and Study information.	Element	M
SWVersion	Name	Name of the software module creating this XML file.	String	M
	Version	Version number of the software module.	String	M
Patient	PatientUIDList	This UID list contains UIDs that uniquely identify a patient across HEYEX databases.	Element	O
	ID	Patient ID internally used in HEYEX database. This ID is unique for the patient in the considered HEYEX database.	String	M
	PatientID	User-defined patient ID.	String	O
	LastName	Patient’s last name.	String	M
	FirstNames	Patient’s first name.	String	M
	Birthdate	Patient’s date of birth.	Date	M
	Sex	Patient’s sex (F,M).	String	M
	PatientComment	User-defined additional information about the patient.	String	O
	Study	Study information.	Element[1..n]	M
PatientUID List	NumUIDs	Number of patient UIDs	Integer	M
	PatientUID	The list of patient UIDs	Element[1..n]	M
PatientUID	Source	Identifies the HEYEX database that created this UID	String	M
	UID	The UID itself that uniquely identifies a patient across HEYEX databases.	String	M
Study	StudyUID	The UID that uniquely identifies a study across HEYEX databases.	String	O
	ID	Study ID internally used in HEYEX database. This ID is unique for the study in the considered HEYEX database.	String	M
	StudyDate	Date of study.	Date	M
	StudyDescription	User-defined study description.	String	O
	Operator	Operator who took the series.	String	O
	ReferringPhysician	The physician who referred the patient to the Study.	String	O

Level	XML Tag	Description	Data Type	Req.
	StudyComment	User-defined additional information about the study.	String	O
	Series	Series information.	Element[1..n]	M

Series	SeriesUID	The UID that uniquely identifies a series across HEYEX databases.	String	O
	ID	Series ID internally used in HEYEX database. This ID is unique for the series in the considered HEYEX database.	String	M
	ExaminedStructure	Describe the anatomic region contained in the series. Possible values are: Retina Macula ONH Iris Lens Cornea External Anterior Chamber Posterior Chamber Sclera Chamber Angle Papillo-Macular Bundle Anterior Segment Peripapillary Retina	String	O
	Modality	Type of equipment that originally acquired the data: OP Ophthalmic Photography OCT Optical Coherence Tomography OT Other	String	M
	ModalityProcedure	Mode of analysis: IR Infrared Reflection FA Fluorescein Angiography RF Blue- or Green-Reflection ICGA ICG Angiography AF Autofluorescence Image MC MultiColor imaging FA_ICGA Simultaneous FA/ICGA FA_IR Simultaneous FA/IR ICGA_IR Simultaneous ICGA/IR RF_IR Simultaneous RF/IR RF_ICGA Simultaneous RF/ICGA RFIR ERG imaging For the OCT modality the modes are defined as follows: xxx_OCT, where xxx is one of the first six Modes of the table above.	String	M

Level	XML Tag	Description	Data Type	Req.
	Type	Type of Series: Single A single image Movie A temporal sequence of images ZScan A 3D image StereoPair A stereo image pair Section A single OCT line scan Circle A circular OCT scan Volume An OCT volume scan FastVolume A fast OCT volume scan (ART disabled) Star A radial OCT scan	String	M
	Laterality	Laterality (L, R, U).	String	M
	ProgID	Progression ID internally used to identify all series belonging to the same progression. This ID is unique across different HEYEX databases. This tag is only available if the series is part of a progression.	String	O
	SeriesComment	User-defined additional information about the series.	String	O
	ReferenceSeries	Contains information about the series that is reference to this series. This tag is only available if the series is part of a progression.	Element	O
	GeneralEquipment	Describes the particular device that produced the series.	Element	M
	OCTFieldSize	This tag is only available for series of OCT modality and describes the dimensions of the OCT scan's field size in degrees. If the Type of Series is *Volume* or *FastVolume*, OCTFieldSize contains width and height dimensions of the volume scan. If the Type of Series is *Section*, OCTFieldSize contains only the width dimension. If the Type of Series is *Star* or *Circle*, OCTFieldSize contains only the diameter of the scan.	Element	O

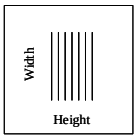
Level	XML Tag	Description	Data Type	Req.
	ThicknessGrid	Describes the results of the retinal thickness measurements. Estimates for the retinal thickness parameters are generated within a grid of a) 9 retinal sectors (Figure 1)  **Figure 1.** Layout of the grid of retinal sectors as generated by the Spectralis software (right eye). I indicates inferior; N, nasal; S, superior; and T, temporal. b) A matrix of n×m cells (Figure 2)  **Figure 2.** Layout of a matrix of n×m cells. All cells have the same width and height. This tag in only available for series of type *Volume*. If the volume series allows the "Posterior Pole" analysis, a 2nd tag of this type will be available containing the results of the "Posterior Pole" analysis.	Element[1..2]	O
	NumImages	Number of images within the series. For a series of the OCT modality this is the number of OCT images + one image for the LOCALIZER image.	Integer	M
	Image	Attributes that describe the pixel data of an image.	Element[1..n]	M

Reference Series	SeriesUID	The UID that uniquely identifies a series across HEYEX databases.	String	O

Level	XML Tag	Description	Data Type	Req.
	ID	Series ID of the reference scan. This ID is identical to the ID defined in the <Series> if the exported scan is reference of the progression, otherwise both IDs are different (follow-up).	String	M
	ExamDate	Examination date of the reference scan.	Date	M

GeneralEquipment	Manufacturer	Manufacturer (Heidelberg Engineering or Other).	String	M
	ManufacturerModelName	Model Name (HRA, HRAII, SPECTRALIS, HRC, Unknown).	String	M
	AQMVersion	Version information about the software that created this image series. This information is not always available.	Element	O

AQMVersion	Name	Name of the software module, which acquired this images series.	String	M
	Version	Version number of the software module, which acquired this image series.	String	M

OCTFieldSize	The terms “Width” and “Height” are independent of the orientation of the B-Scans.  			***a***	***b***
	Width	Width of a B-Scan’s in degrees. Only available for OCT series of type *Section*, *Volume* and *FastVolume*.	Float	M	-
	Height	The distance between the first and the last B-Scan in an OCT series of type *Volume* and *FastVolume*. It is not available for other series types	Float	O	-
	Diameter	Diameter of a *Star* or *Circle* scan.	Float	-	M

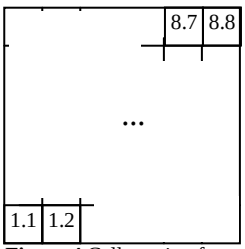
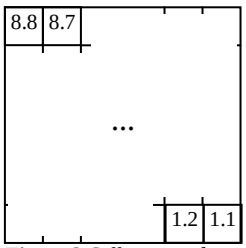
[a] = For OCT series of type Section, Volume and FastVolume

[b] = For OCT series of type Star and Circle

Level	XML Tag	Description	Data Type	Req.
ThicknessGrid	Type	Type of the grid. Six types are currently supported. They differ either in the diameters of their ring zones, or the number of rows and columns Type — Description 1 — 9 retinal sectors. Ring diameters 1.00, 2.00, and 3.00 mm. 2 — 9 retinal sectors. Ring diameters 1.00, 2.22, and 3.45 mm. 3 (ETDRS) — 9 retinal sectors. Ring diameters 1.00, 3.00, and 6.00 mm. 8 — 15° PMB grid with 2×5 cells. 9 — 20° PMB grid with 2×10 cells. 10 — Posterior Pole Grid with 8×8 cells.	Integer	M
	Name	Name of the grid type (Grid1, Grid2 or ETDRS)	String	M
	CenterPos	The grid's center position relative to the upper left corner of the LOCALIZER image in pixel.	Coord	M
	IsDefaultPos	Determines whether the grid's position is the default position (true), or if its position has been manually modified by the user (false).	Boolean	M
	The following tags are only available for a thickness grid of type 1, 2 and 3			
	Diameter1	Diameter of Zone A in mm (see Figure 1).	Float	M
	Diameter2	Diameter of Zone B in mm (see Figure 1).	Float	M
	Diameter3	Diameter of Zone C in mm (see Figure 1).	Float	M
	CentralThickness[1]	Thickness at the center position of the grid in mm.	Float	M
	MinCentralThickness[1]	Minimal thickness found in the inner circle zone of the grid in mm.	Float	M
	MaxCentralThickness[1]	Maximal thickness found in the inner circle zone of the grid in mm.	Float	M
	TotalVolume[1]	Total volume of the grid (all zones) in mm^3.	Float	M
	The following tags are only available for a thickness grid of type 8, 9 and 10			
	NumRows	Number of rows in the grid matrix (see Figure 2).	Integer	M
	NumColumns	Number of columns in the grid matrix (see Figure 2).	Integer	M
	TiltAngle	Tilt angle of the grid in degrees.	Float	M

[1] If this parameter cannot be generated from the data, it appears as an empty element tag (<tag-name/>) in the XML file.

Level	XML Tag	Description	Data Type	Req.
	CellWidth	Width of a single cell in mm (see Figure 2).	Float	M
	CellHeight	Height of a single cell in mm (see Figure 2).	Float	M
	Zone	Retinal thickness parameters of the retinal sectors/cells of the grid. **n** depends on the grid type: **n** = 9 for thickness grids of *Type* 1, 2 and 3 **n** = *NumRows*×*NumColumns* for thickness grids of *Type* 8, 9 and 10.	Element[**n**]	M

Zone	Name	Identifier of the zone/cell. Name | Identifiers of circular grid zone C0 | Zone A T1, T2 | temporal sectors of Zone B and C. S1, S2 | superior sectors of Zone B and C. N1, N2 | nasal sectors of Zone B and C. I1, I2 | inferior sectors of Zone B and C. For the cells of a matrix grid, the name is composed of the 1-based row and column index of the cell in the format: *row.column* (e.g. "1.5" for 1st row, 5th column). For thickness grids of *Type* 8 and 9 (PMB grids), the upper left cell of the matrix is always named "1.1".  For thickness grids of *Type* 10 (Posterior Pole grid), the lower right/left cell of the matrix is named "1.1" for left/right eyes (i.e. the matrix cell at temporal inferior is "1.1").  **Figure 4** Cell naming for right eye.  **Figure 3** Cell naming for left eye	String	M
	AvgThickness[1]	Average thickness of the zone in mm.	Float	M
	Volume[1]	Volume of the zone in mm³.	Float	M

Level	XML Tag	Description	Data Type	Req.
	ValidPixelPercentage	Percentage of valid pixels inside the zone (in %), which contribute to the calculation of *AvgThickness* and *Volume*. If *ValidPixelPercentage* < 50%, the tags *AvgThickness* and *Volume* are empty.	Float	M

Image	ID	ID of the image. In case of stereo or simultaneous images, both images have the same ID.	String	M
	ImageNumber	Number of the image in a multi frame series.	String	M
	Laterality	Laterality (L, R, U).	String	M
	AcquisitionTime	Time of acquisition. For HRA and SPECTRALIS images this time is in UTC format. **Note**: For older HRA/SPECTRALIS images the UTCBias (see definition of Data Type Time) for this time value is not available and therefore it cannot be translated into a local time.	Time	M
	Injection	Time after injection.	Time	O
	ImageType	Describes the type of an image.	Element[1]	M
	OphthalmicAcquisition Context	Describes the acquisition parameters of an image. The parameters depend on the ImageType.	Element[1]	M
	ImageData	Contains information about the file containing the image's pixel data.	Element[1]	O

ImageType	Type	Type of image: ANGIO Angiography image. OCT OCT image. IMG Other image. LOCALIZER Localizer image for the OCT images.	String	M

Level	XML Tag	Description	Data Type	Req.
	LightSource	Light source used to acquire the image: COLOR Picture taken at “white” light. IR Picture taken at “infrared” illumination light. FA Picture taken at Fluorescein exciting illumination light. ICG Picture taken at Indocyanine green exciting illumination light. RF Picture taken at “blue” or “green” illumination light (red free). AF Picture taken at “blue” illumination light (Blue Peak) MC Picture taken with multiple laser colors (MultiColor).	String	O
	PairType	Defines which part of a stereo or simultaneous image pair the image is. Images that belong to the same stereo or simultaneous image have the same ID. STEREO_L Left stereo image. STEREO_R Right stereo image. SIMUL_L Left simultaneous image. SIMUL_R Right simultaneous image.	String	O

Ophthalmic Acquisition Context	Width	Image width in pixel.	Integer	M	
	Height	Image height in pixel.	Integer	M	
	The following Parameters are only available for images of type ANGIO, LOCALIZER (a) and OCT (b). They are not defined for other image types.			*a*	*b*
	ScaleX	Pixel width in mm.	Float	M	M
	ScaleY	Pixel height in mm.	Float	M	M
	Angle	Field size in degrees.	Integer	M	-
	SensorGain	Gain of digital sensor	Integer	M	-
	AutoSensorGain	Automatic sensor gain	Boolean	M	-
	Resolution	Resolution of the image (HIRES, LORES).	String	M	M
	NumAve	Number of frame averaged.	Integer	O	M
	ImageQuality	Image quality in dBs This parameter is available for OCT scans acquired with Spectralis acquisition module version 3.2.0 or higher.	Integer	-	O
	Focus	Scan focus in dpt.	Float	M	-
	Depth	Scan depth of a ZScan in mm.	Float	O	-

a = For images of type ANGIO and LOCALIZER

b = For image of type OCT

Level	XML Tag	Description	Data Type	Req.	
	EDI	B-Scan acquired using Enhanced Depth Imaging mode. This parameter is available for OCT scans acquired with Spectralis acquisition module version 5.2.4 or higher.	Boolean	-	O
	PositionWithin Tolerance	B-Scan's position is within tolerance. This parameter is available for OCT scans acquired with SPECTRALIS acquisition module version 5.1.2 or higher.	Boolean	-	O
	Start	Start position of a linear OCT scan, or starting point of a circular OCT scan relative to the upper left corner of the cSLO image (localizer) in mm.	Coord	-	M
	End	End position of a linear OCT scan relative to the upper left corner of the cSLO image (localizer) in mm.	Coord	-	M
	Center	Central position of a circular OCT scan relative to the upper left corner of the cSLO image (localizer) in mm.	Coord	-	M
	Direction	Direction of a circular OCT scan: CW Clockwise CCW Counterclockwise	String	-	O
	FixationTarget	Fixation target during image acquisition. The nine possible positions of the internal fixation target are indicated by a number according the following scheme: 1 2 3 4 5 6 7 8 9 A value of 10 means that the external fixation target was used.	Integer	O	-
ImageData	Extension	Filename extension (tif, bmp, jpg)	String	M	
	ExamURL	Path to the image data file. The path specification begins with the prefix "`file:///`" followed by the full path of the image data file.	String	M	

6.3 Examples

6.3.1 Export of a single FA image

```
<HEDX>
   <HEAD>
   </HEAD>
   <BODY>
      <ExportType>Data</ExportType>
      <SWVersion>
          <Name>Spectralis Viewing Module</Name>
          <Version>5.8.1.0</Version>
      </SWVersion>
      <Patient>
         <ID>1245</ID>
         <PatientID></PatientID>
         <LastName>Doe</LastName>
         <FirstNames>Joe</FirstNames>
         <Birthdate>
            <Date>
              <Year>1979</Year>
              <Month>12</Month>
              <Day>19</Day>
            </Date>
         </Birthdate>
         <Sex>M</Sex>
         <PatientComment>
            This is a comment to the patient
         </PatientComment>
         <Study>
            <ID>1118</ID>
            <StudyDate>
              <Date>
                <Year>2007</Year>
                <Month>5</Month>
                <Day>23</Day>
              </Date>
            </StudyDate>
            <StudyDescription>This is a description to the
            study</StudyDescription>
            <Operator>Dr. Smith</Operator>
            <Series>
              <ID>88.0</ID>
              <Modality>OP</Modality>
              <ModalityProcedure>FA</ModalityProcedure>
              <Type>Single</Type>
              <NumImages>1</NumImages>
              <GeneralEquipment>
                <Manufacturer>Heidelberg Engineering</Manufacturer>
                <ManufacturerModelName>Spectralis</ManufacturerModelName>
                <AQMVersion>
                  <Name>Spectralis Acquisition Module</Name>
                  <Version>3.1.4.0</Version>
                </AQMVersion>
              </GeneralEquipment>
              <Image>
                <ID>0</ID>
                <ImageNumber>0</ImageNumber>
                <Laterality>R</Laterality>
                <AcquisitionTime>
```

```
                  <Time>
                    <Hour>13</Hour>
                    <Minute>27</Minute>
                    <Second>23.7</Second>
                  </Time>
               </AcquisitionTime>
               <Injection>
                  <Time>
                    <Hour>0</Hour>
                    <Minute>28</Minute>
                    <Second>23.7</Second>
                  </Time>
               </Injection>
               <ImageType>
                  <Type>ANGIO</Type>
               </ImageType>
               <OphthalmicAcquisitionContext>
                  <Width>768</Width>
                  <Height>768</Height>
                  <ScaleX>0.01092</ScaleX>
                  <ScaleY>0.01092</ScaleY>
                  <Angle>30</Angle>
                  <SensorGain>12</SensorGain>
                  …
               </OphthalmicAcquisitionContext>
               <ImageData>
                  <Extension>tif</Extension>
                  <ExamURL>file:///c:/TEMP/132.465.789.987.tif</ExamURL>
               </ImageData>
            </Image>
         </Series>
      </Study>
   </Patient>
</BODY>
</HEDX>
```

6.3.2 Export of an ICG Movie (100 images)

```
<HEDX>
   …
   <BODY>
      …
      <Patient>
         …
         <Study>
            …
            <Series>
              <ID>89.0</ID>
              <Modality>OP</Modality>
              <ModalityProcedure>ICGA</ModalityProcedure>
              <Type>Movie</Type>
              <NumImages>100</NumImages>
              …
              <Image>
                <ID>0</ID>
                <ImageNumber>0</ImageNumber>
                …
                <ImageData>
                   <Extension>tif</Extension>
                   <ExamURL>file:///c:/TEMP/132.465.789.987.tif</ExamURL>
                </ImageData>
              </Image>
              <Image>
                <ID>1</ID>
                <ImageNumber>1</ImageNumber>
                …
                <ImageData>
                   <Extension>tif</Extension>
                   <ExamURL>file:///c:/TEMP/132.465.789.988.tif</ExamURL>
                </ImageData>
              </Image>

              …

              <Image>
                <ID>99</ID>
                <ImageNumber>99</ImageNumber>
                …
                <ImageData>
                   <Extension>tif</Extension>
                   <ExamURL>file:///c:/TEMP/132.465.789.1086.tif</ExamURL
                   >
                </ImageData>
              </Image>
            </Series>
         </Study>
      </Patient>
   </BODY>
</HEDX>
```

The 100 ICGA images

6.3.3 Export of a single simultaneous FA/ICG-image

```
<HEDX>
   …
   <BODY>
      <Patient>
         …
         <Study>
            …
            <Series>
              <ID>89.0</ID>
              <Modality>OP</Modality>
              <ModalityProcedure>FA_ICGA</ModalityProcedure>
              <Type>Single</Type>
              <NumImages>1</NumImages>
              …
              <Image>
                <ID>0</ID>
                <ImageNumber>0</ImageNumber>
                <ImageType>
                   <Type>ANGIO</Type>
                   <LightSource>ICG</LightSource>
                   <PairType>SIMUL_L</PairType>
                </ImageType>

                …
                <ImageData>
                   <Extension>tif</Extension>
                   <ExamURL>file:///c:/TEMP/132.465.789.987.tif</ExamURL>
                </ImageData>
              </Image>
              <Image>
                <ID>0</ID>
                <ImageNumber>1</ImageNumber>
                <ImageType>
                   <Type>ANGIO</Type>
                   <LightSource>FA</LightSource>
                   <PairType>SIMUL_R</PairType>
                </ImageType>
                …
                <ImageData>
                   <Extension>tif</Extension>
                   <ExamURL>file:///c:/TEMP/132.465.789.988.tif</ExamURL>
                </ImageData>
              </Image>
            </Series>
         </Study>
      </Patient>
   </BODY>
</HEDX>
```

The ICG image of the simultaneous scan.

The FA image of the simultaneous scan.

6.3.4 Export of an OCT Volume Scan

```
<HEDX>
   …
   <BODY>
      …
      <Patient>
         …
         <Study>
            …
            <Series>
              <ID>89.0</ID>
              <Modality>OCT</Modality>
              <ModalityProcedure>IR</ModalityProcedure>
              <Type>Volume</Type>
              <NumImages>10</NumImages>
              …
              <Image>
                <ID>0</ID>
                <ImageNumber>0</ImageNumber>
                …
                <ImageType>
                   <Type>LOCALIZER</Type>
                   <LightSource>IR</LightSource>
                </ImageType>
                <ImageData>
                   <Extension>tif</Extension>
                   <ExamURL>file:///c:/TEMP/132.465.789.987.tif</ExamURL>
                </ImageData>
              </Image>
              <Image>
                <ID>1</ID>
                <ImageNumber>1</ImageNumber>
                …
                <ImageType>
                   <Type>OCT</Type>
                </ImageType>
                <ImageData>
                   <Extension>tif</Extension>
                   <ExamURL>file:///c:/TEMP/132.465.789.988.tif</ExamURL>
                </ImageData>
              </Image>
              …
              <Image>
                <ID>9</ID>
                <ImageNumber>9</ImageNumber>
                …
                <ImageType>
                   <Type>OCT</Type>
                </ImageType>
                <ImageData>
                   <Extension>tif</Extension>
                   <ExamURL>file:///c:/TEMP/132.465.789.1086.tif</ExamURL
                   >
                </ImageData>
              </Image>
            </Series>
         </Study>
      </Patient>
   </BODY>
</HEDX>
```

This is the cSLO reference image for the OCT scans

These are the images of the OCT scans

6.3.5 Export without images; UIDs are set in the HEYEX database

```
<HEDX>
   <HEAD>
   </HEAD>
   <BODY>
      <ExportType>Data</ExportType>
      <SWVersion>
          <Name>Spectralis Viewing Module</Name>
          <Version>5.8.1.0</Version>
      </SWVersion>
      <Patient>
         <PatientUIDList>
            <NumUIDs>2</NumUIDs>
            <PatientUID>
              <Source>29624935</Source>
              <UID>…10.7.15070104.13008772315.17401.7</UID>
            </PatientUID>
            <PatientUID>
              <Source>29624935</Source>
              <UID>…10.7.15070104.13008656788.17401.7</UID>
            </PatientUID>
         </PatientUIDList>
         <ID>1245</ID>
         <PatientID></PatientID>
         <LastName>Doe</LastName>
         <FirstNames>Joe</FirstNames>
         <Birthdate>
            <Date>
              <Year>1979</Year>
              <Month>12</Month>
              <Day>19</Day>
            </Date>
         </Birthdate>
         <Sex>M</Sex>
         <PatientComment>
            This is a comment to the patient
         </PatientComment>
         <Study>
            <StudyUID>…9.8.15070104.13008775856.17401.8</StudyUID>
            <ID>1118</ID>
            <StudyDate>
              <Date>
                <Year>2007</Year>
                <Month>5</Month>
                <Day>23</Day>
              </Date>
            </StudyDate>
            <StudyDescription>This is a description to the
            study</StudyDescription>
            <Operator>Dr. Smith</Operator>
            <StudyComment>
               This is a comment to the Study
            </StudyComment>
            <Series>
             <SeriesUID>…9.9.15070104.13347567886.17401.9.0</SeriesUID>
              <ID>88.0</ID>
              <Modality>OCT</Modality>
              <ModalityProcedure>IR</ModalityProcedure>
              <Type>Volume</Type>
              <NumImages>20</NumImages>
             <SeriesComment>
```



```
                This is a comment to the series
              </SeriesComment>
              <GeneralEquipment>
                <Manufacturer>Heidelberg Engineering</Manufacturer>
                <ManufacturerModelName>Spectralis</ManufacturerModelName>
                <AQMVersion>
                  <Name>Spectralis Acquisition Module</Name>
                  <Version>3.1.4.0</Version>
                </AQMVersion>
              </GeneralEquipment>
              <ThicknessGrid>
                  <Type>3</Type>
                  <Name>ETDRS</Name>
                  …
                  <CentralThickness>12.7</CentralThickness>
                  …
              </ThicknessGrid>
            </Series>
          </Study>
        </Patient>
    </BODY>
</HEDX>
```

7 Configuration

The table below shows the parameters which can be configured for the XML data export. All these parameters, except for the XML declaration, can be configured in the Heidelberg Eye Explorer application (Setup > Options > Plugins tab > select hraviewer > Setup > Data Export Options > XML Data Export).

Alternatively, the configuration parameters can be specified under the section `[XmlExport]` in the file hraviewer.ini. (default location: C:\HEYEX\plugins\)

Table 6: Configuration keys

Key	Description
Workspace	Specifies the path to a folder into which HEYEX will create the data files. If this key is not specified, the data files will be created in the folder defined by Windows environment variable %TEMP%. **Example**: `Workspace=C:\MyData`
Exe	Name of an optional executable that will be launched by HEYEX after the data files have been created. If the path to the executable file is not specified, HEYEX tries to locate this application file in one of the directories defined by Windows environment variable %PATH%. **Example**: `Exe=C:\Program File\My App\myapp.exe`
ExportImages	By default, the cSLO images and B-Scans will be exported as graphics files. This default behavior can be changed via the key below. If this key is set to 0, the images will not be exported and the XML file does not contain tag <ImageData> of tags <Image>. The default value for this key is 1. **Example**: `ExportImages=0`
Format	Format of the image files. Currently the images can be stored as TIF, BMP, or JPG files (see chapter "File Formats"). The default file format is TIF. Possible values for this parameter are: TIF Creates TIF files BMP Creates BMP files JPG Creates JPG files **Example**: `Format=JPG  ;create Jpeg files`
Align	By default, the cSLO image and the B-Scans of OCT follow-up exams are aligned to their counterparts in the correspondent reference exam. This default behavior can be changed via this keyword. Align=0/1 switches off/on the image alignment. The default value is 1. **Example**: `Align=0  ;switch off follow-up alignment`
Anonymize	Depersonalize the XML output. If this key is set to 1, the tag <Patient> just contains the tags <ID> and <Study>, all other tags are not present in the XML file. **Example**: `Anonymize=1`
XmlDecl	By default the XML file does not contain any XML declaration. The key XmlDecl defines the XML declaration that will be included as first line into the XML file. **Example**: `XmlDecl=<?xml version="1.0" encoding="ISO-8859-1"?>`

