DICOM Conformance Statement

CALLISTO eye®

Software Version 3.7

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1 Conformance Statement Overview

The CALLISTO eye software offers functions for surgery documentation, e.g. for video recording and temporary storage of the data gathered during surgery. The software supplies the surgical team with relevant information and provides an interface for the control of surgical instruments in the operating room.

The DICOM interface is used to

- Query for Modality Worklist to import patient data
- Import FCW Scheduling datasets. The FCW Scheduling dataset supports the ASSISTANCE-System
- Store recorded images, videos, OCT captures and surgery reports

This document is structured as suggested in the DICOM Standard (PS 3.2: Conformance).

Table 1-1 Network Services Supported

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
Ophthalmic Photography 8 Bit Image Storage	Yes	No
Ophthalmic Tomography Image Storage	Yes	No
Raw Data Storage	Yes[1)]	Yes[2)]
Workflow Management		
Modality Worklist Information Model - FIND	Yes	No
Query / Retrieve		
Study Root Query/Retrieve Information Model – FIND	Yes	No
Study Root Query/Retrieve Information Model – MOVE	Yes	No

[1)] Only CallistoSurgeryReportRawData Objects

[2)] Only FCW Scheduling Objects

The SOP Classes are categorized as follows:

Table 1-2 UID Values

UID Value	UID Name	Category
1.2.840.10008.1.1	Verification	Workflow Management
1.2.840.10008.1.20.1	Storage Commitment Push Model SOP Class	Workflow Management
1.2.840.10008.5.1.4.1.1.66	Raw Data Storage	Transfer
1.2.840.10008.5.1.4.1.1.77.1.5.1	Ophthalmic Photography 8 Bit Image Storage	Transfer
1.2.840.10008.5.1.4.1.1.77.1.5.4	Ophthalmic Tomography Image Storage	Transfer
1.2.840.10008.5.1.4.1.2.2.1	Study Root Query/Retrieve Information Model – FIND	Query/Retrieve
1.2.840.10008.5.1.4.1.2.2.2	Study Root Query/Retrieve Information Model – MOVE	Query/Retrieve
1.2.840.10008.5.1.4.31	Modality Worklist Information Model - FIND	Workflow Management

The CALLISTO eye does not support Media Interchange.

2 Table of Contents

3 Introduction

3.1 Revision History

Table 3-1 Revision History

Document Version	Date	Author	Changes
I	2019-04	MBE	Initial Version for CALLISTO eye 3.7 Usage of new DICOM Conformance Statement Template. Changes between CALLISTO eye 3.6.2 to CALLISTO eye 3.7: Support for MPEG-4 HD Video, NIM Update to Version 2.11

3.2 Audience

This document is written for the people that need to understand how CALLISTO eye Software will integrate into their healthcare facility. This includes both those responsible for overall imaging network policy and architecture, as well as integrators who need to have a detailed understanding of the DICOM features of the product. This document contains some basic DICOM definitions so that any reader may understand how this product implements DICOM features. However, integrators are expected to fully understand all the DICOM terminology, how the tables in this document relate to the product's functionality, and how that functionality integrates with other devices that support compatible DICOM features.

3.3 Remarks

The scope of this DICOM Conformance Statement is to facilitate integration between CALLISTO eye Software and other DICOM products. The Conformance Statement should be read and understood in conjunction with the DICOM Standard. DICOM by itself does not guarantee interoperability. The Conformance Statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality.

This Conformance Statement is not supposed to replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, the user should be aware of the following important issues:

- The comparison of different Conformance Statements is just the first step towards assessing interconnectivity and interoperability between the product and other DICOM conformant equipment.
- Test procedures should be defined and executed to validate the required level of interoperability with specific compatible DICOM equipment, as established by the healthcare facility.

3.4 Definitions and Terms

Informal definitions are provided for the following terms used in this Conformance Statement.

The DICOM Standard is the authoritative source for formal definitions of these terms.

Abstract Syntax

The information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class.

Examples: Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.

Application Entity (AE)

An end point of a DICOM information exchange, including the DICOM network or media interface software; i.e., the software that sends or receives DICOM information objects or messages. A single device may have multiple Application Entities.

Application Entity Title

The externally known name of an Application Entity, used to identify a DICOM application to other DICOM applications on the network.

Application Context

The specification of the type of communication used between Application Entities.

Example: DICOM network protocol.

Association

A network communication channel set up between Application Entities.

Attribute

An unit of information in an object definition; a data element identified by a tag. The information may be a complex data structure (Sequence), itself composed of lower level data elements.

Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).

Information Object Definition (IOD)

The specified set of Attributes that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The Attributes may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C).

Examples: MR Image IOD, CT Image IOD, Print Job IOD.

IOLMaster®

The IOLMaster 700 device is a combined biometry instrument for the visualization of eye structures and acquisition of data of the human eye required for the calculation of the intraocular lens to be implanted.

Joint Photographic Experts Group (JPEG)

A set of standardized image compression techniques, available for use by DICOM applications.

Media Application Profile

The specification of DICOM information objects and encoding exchanged on removable media (e.g., CDs)

Module

A set of Attributes within an Information Object Definition that are logically related to each other.

Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex.

Negotiation

First phase of Association establishment that allows Application Entities to agree on the types of data to be exchanged and how that data will be encoded.

Presentation Context

The set of DICOM network services used over an Association, as negotiated between Application Entities; includes Abstract Syntaxes and Transfer Syntaxes.

Protocol Data Unit (PDU)

A packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.

Query Key

An input value for a query process. Query Keys denote the set of DICOM tags that are sent from the SCU to SCP and thus control the query result.

Security Profile

A set of mechanisms, such as encryption, user authentication, or digital signatures, used by an Application Entity to ensure confidentiality, integrity, and/or availability of exchanged DICOM data

Service Class Provider (SCP)

Role of an Application Entity that provides a DICOM network service; typically, a server that performs operations requested by another Application Entity (Service Class User).

Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).

Service Class User (SCU)

Role of an Application Entity that uses a DICOM network service; typically, a client.

Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU)

Service/Object Pair (SOP) Class

The specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification.

Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.

Service/Object Pair (SOP) Instance

An information object; a specific occurrence of information exchanged in a SOP Class.

Examples: a specific x-ray image.

Tag

A 32-bit identifier for a data element, represented as a pair of four digit hexadecimal numbers, the “group” and the “element”. If the “group” number is odd, the tag is for a private (manufacturer-specific) data element.

Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [private data element]

Transfer Syntax

The encoding used for exchange of DICOM information objects and messages.

Examples: JPEG compressed (images), little endian explicit value representation.

Unique Identifier (UID)

A globally unique “dotted decimal” string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier.

Examples: Study Instance UID, SOP Class UID, SOP Instance UID.

Value Representation (VR)

The format type of an individual DICOM data element, such as text, an integer, a person’s name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

3.5 Abbreviations

Table 3-2 Abbreviations used in this document

Abbreviation	Definition
AE	Application Entity
AET	Application Entity Title
BMP	Bitmap
DICOM	Digital Imaging and Communications in Medicine
ILE	Implicit Little Endian
ELE	Explicit Little Endian
FCW	FORUM Cataract Workplace
GUI	Graphical User Interface
IOD	Information Object Definition

JPG-1	JPEG Coding Process 1 transfer syntax; JPEG Baseline; ISO 10918-1
JPG-LL	JPEG Lossless
J2K	JPEG 2000 Image Compression
J2K-LL	JPEG 2000 Image Compression (Lossless Only)
MWL	Modality Worklist
MPEG-4	Motion Picture Expert Group 4; Abbreviation and synonym for video encoding and compression transfer syntax. AVC/H.264 High Level 4.1
NIM	Network Integration Manager: common networking component from CZM
OCT	Optical coherence tomography
OD	Oculus Dexter, the right eye
OS	Oculus Sinister, the left eye
OU	Oculus Uterque, both eyes
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair, union of a specific DICOM service and related IOD.
SRQ	Study Root Query
TCP/IP	Transmission Control Protocol / Internet Protocol
UID	Unique Identifier
IM	Information Model

3.6 References

NEMA PS3 / ISO 12052, Digital Imaging and Communications in Medicine (DICOM) Standard, National Electrical Manufacturers Association, Rosslyn, VA, USA (available free at http://medical.nema.org/)

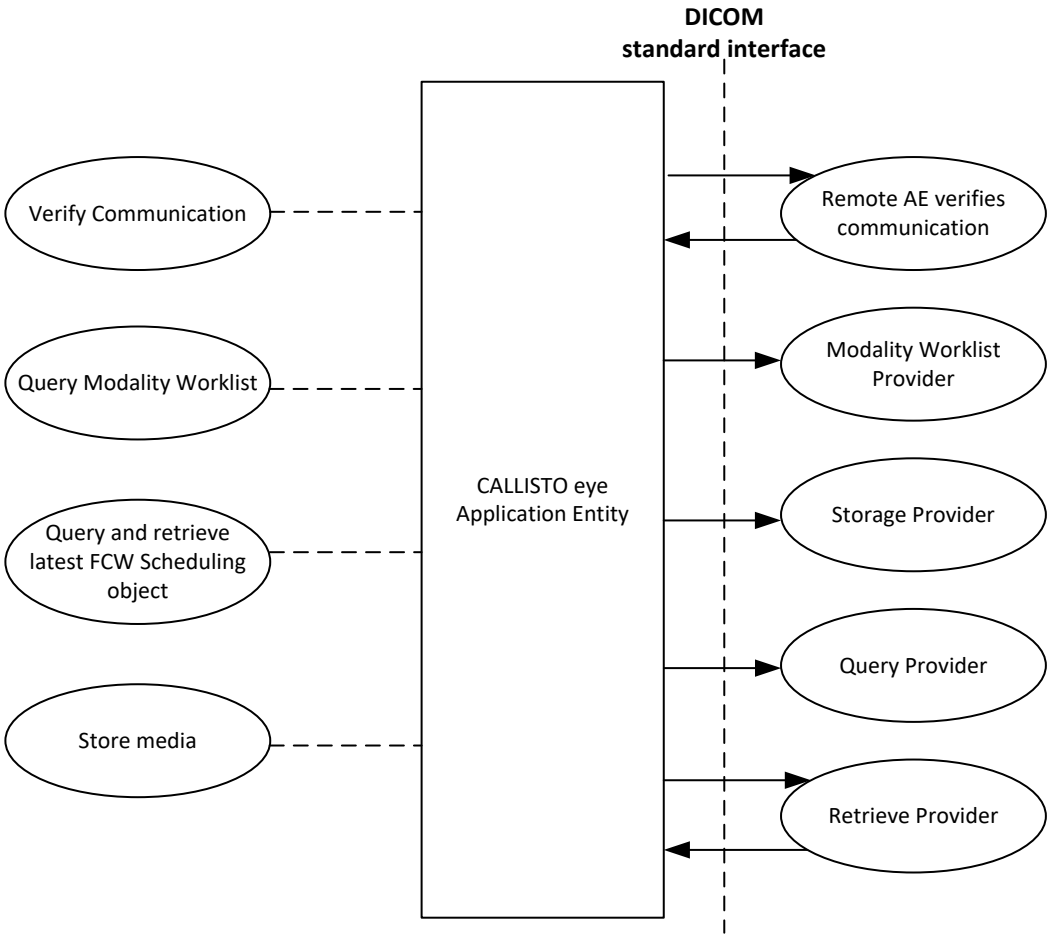
Integrating the Healthcare Enterprise (IHE) EYECARE Technical Framework, rev 3.7, 2010 (available free at http://www.ihe.net/Technical_Framework/index.cfm

4 Networking

4.1 Implementation Model

4.1.1 Application Data Flow

Figure 4-1 CALLISTO eye Application Software as Acquisition Modality



4.1.2 Functional Definition of AEs

4.1.2.1 Functional Definition of CALLISTO eye

The CALLISTO eye software offers functions for surgery documentation, e.g. for video recording and temporary storage of the data gathered during surgery. The software supplies the surgical team with relevant information and provides an interface for the control of surgical instruments in the operating room.

The DICOM interface is used to

- Query for Modality Worklist to import patient data
- Import FCW Scheduling datasets. The FCW Scheduling dataset supports the ASSISTANCE-System
- Store recorded images, videos, OCT captures and surgery reports

CALLISTO eye AE runs the following DICOM Service as Service Class User (SCU)

- Verification
- Modality Worklist Information Model – FIND
- Study Root Query / Retrieve Information Model – FIND
- Study Root Query / Retrieve Information Model – MOVE
- Ophthalmic Photography 8 Bit Image Storage
- Ophthalmic Tomography Image Storage
- Raw Data Storage (CallistoSurgeryReportRawData)

CALLISTO eye AE runs the following DICOM Service as Service Class Provider (SCP)

- Verification
- Raw Data Storage (only FCW Scheduling Objects)

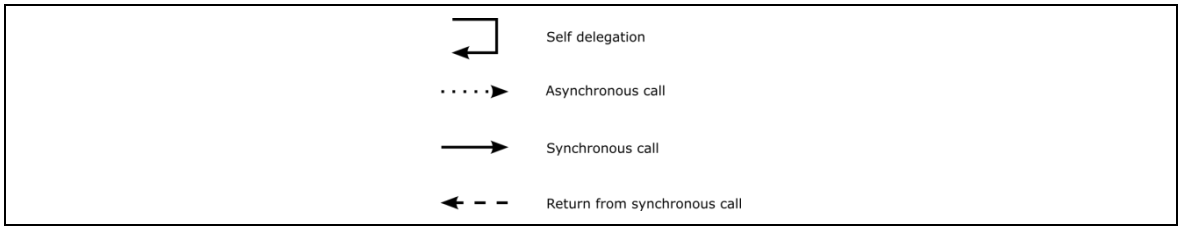
All DICOM related activities are triggered manually by operator.

The CALLISTO eye Software allows performing a verification of the configured AEs. The result of the verification contains information about the supported SOP Classes and Transfer Syntaxes.

The CALLISTO eye Software logs extensive information about the DICOM operations to its log file.

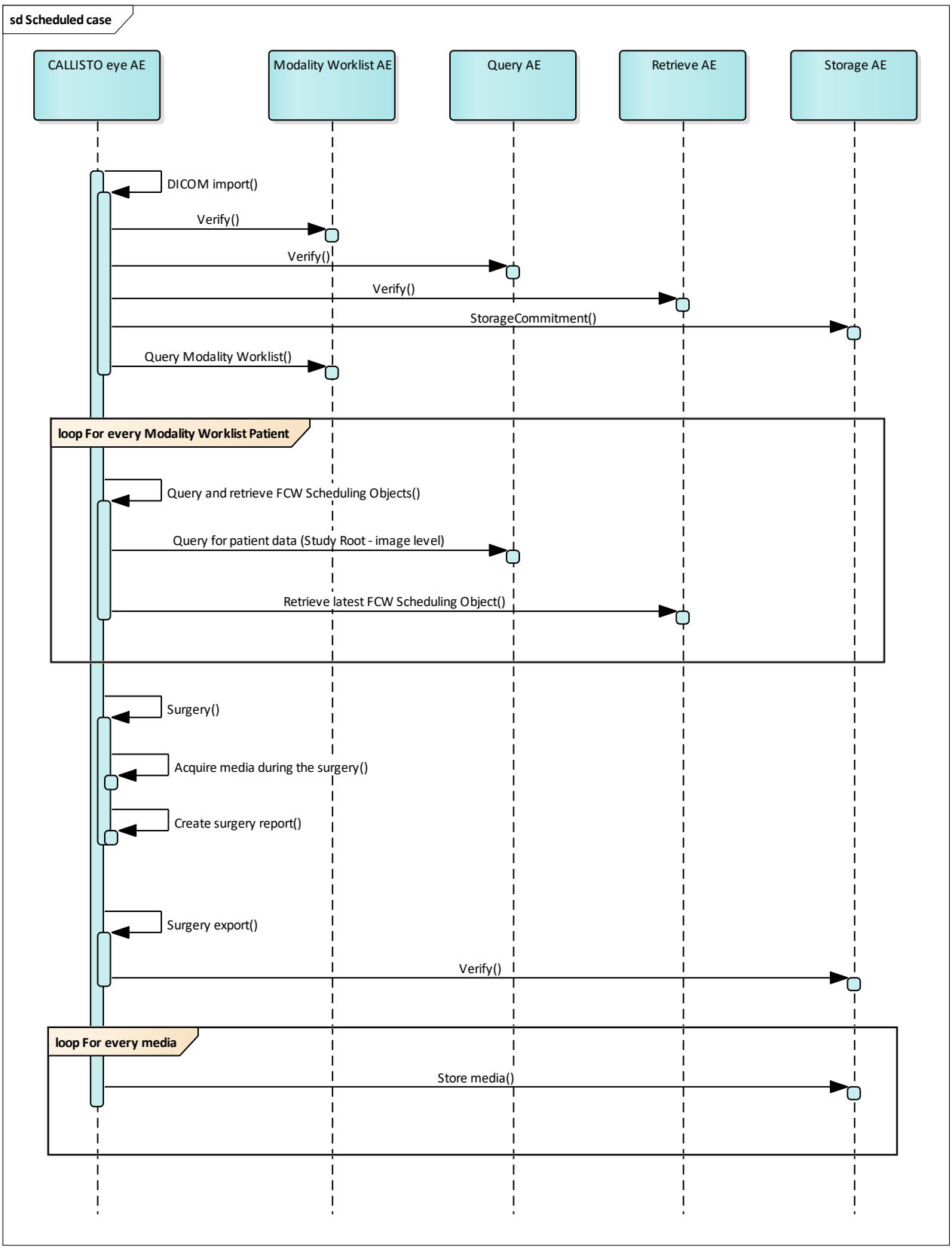
4.1.3 Sequencing of Real-World Activities

To realize the real world activities, the different entities work together. The sequence diagrams shall depict the intended workflow.



The diagrams use slightly modified UML symbols. The asynchronous call is not depicted as suggested in UML. Some objects do have more than one dashed line. It symbolizes more than one thread.

4.1.3.1 Scheduled case with Acquisition Modality



Main activities are initiated by an operator. The sequence diagram shows different phases. An operator triggers the DICOM activities in the planning phase (DICOM Import) and the export phase (Surgery export).

The demographic data of all patients in CALLISTO eye which were imported by Modality Worklist are read only and cannot be changed by the operator. For that the Modality Worklist Provider is the leading system. To change data for an imported patient, delete the patient in CALLISTO eye, change the data in the Modality Worklist Provider and reimport it.

DICOM Import

The action “DICOM Import” is triggered by the operator. The configuration of the remote Application Entities has to be completed before this functionality can be used.

The CALLISTO eye sends a verification request to all configured remote AEs. The goal is to check the availability of the remote AEs that are needed for import process step (MWL, Query, Retrieve) and check own port with a storage commitment. A failed check will cause an Auto-Connect request if Auto-Connect is enabled in DICOM configuration.

This is an optional activity. The activity has to be triggered by operator. Before the Modality Worklist Query is started an automatic DICOM Verification has to be successfully performed.

Query and retrieve FCW Scheduling Objects

This activity happens automatically after a previous Modality Worklist Query.

An additional verification request is sent to the configured remote AEs.

For every patient in the active Modality Worklist a Study Root Query is initiated to find all FCW Scheduling Objects that were created as preparation for patient’s surgery.

CALLISTO eye AE requires the Query SCP to support relational queries. All queries performed by the CALLISTO eye AE are relational queries.

Retrieve latest FCW Scheduling Object

The CALLISTO eye AE automatically retrieves the latest FCW Scheduling Object coming from the Study Root Query results. This step only happens when at least one FCW Scheduling per patient was found.

Surgery

The operator can start surgeries. To activate this function the laterality of the examined eye has to be set.

Acquire media during surgery

The operator can take videos, still images and OCT data during the surgery.

Create surgery report

The CALLISTO eye automatically creates surgery report at the moment the surgery is stopped.

Store media (images, videos, OCT data and surgery report)

This is an optional activity.

The operator selects the studies which shall be exported from a pick list.

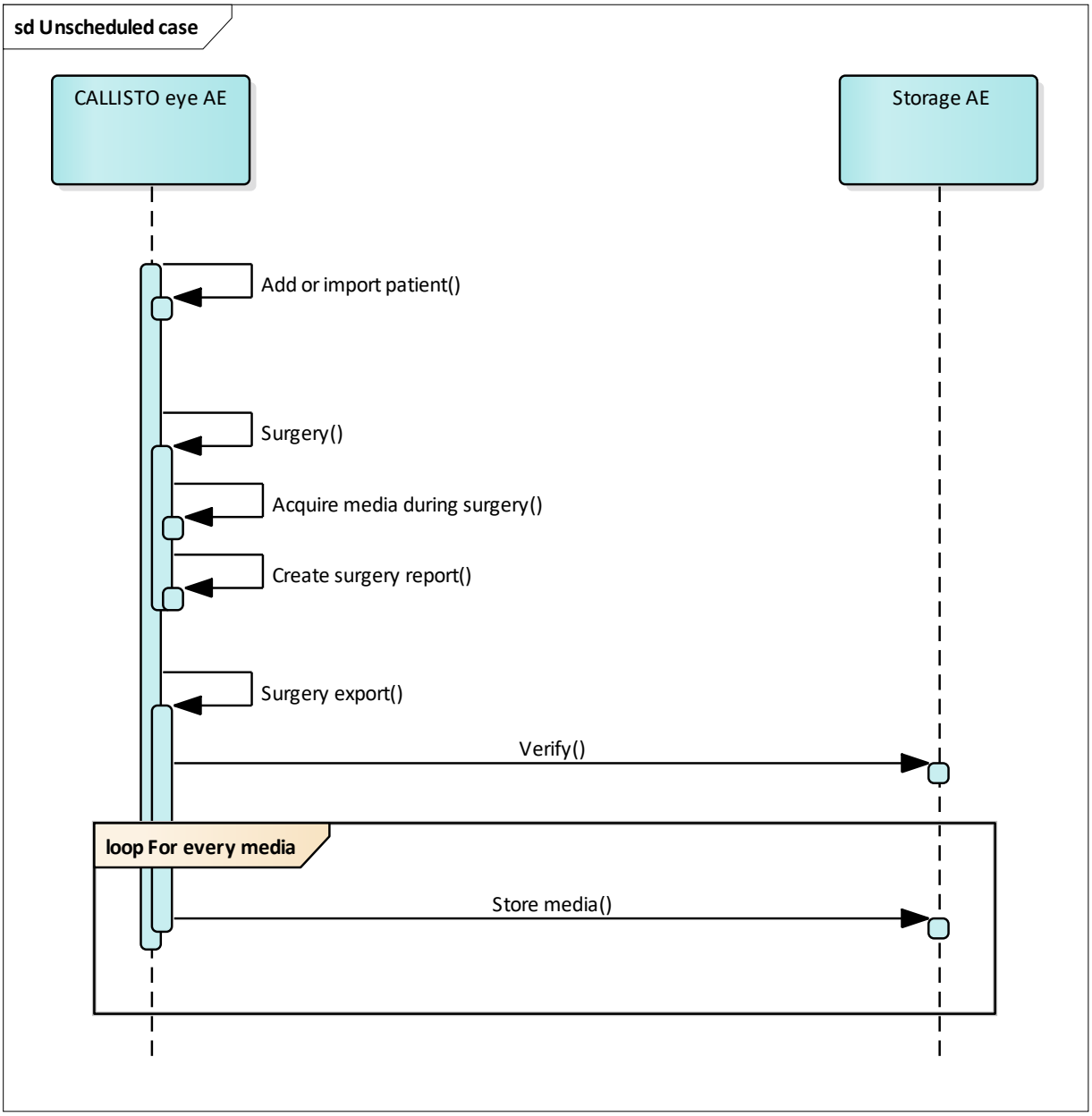
The CALLISTO eye sends a verification request to all configured remote AEs. The goal is to check the availability of the remote AEs that are needed for export process step (Storage). A failed check will cause an Auto-Connect request if Auto-Connect is enabled in DICOM configuration.

All acquired images, videos, OCT captures and the surgery report for FCW of the selected studies are sent to the configured Storage Provider. The storage progress is reflected in a dialog.

4.1.3.2 Unscheduled case

In the unscheduled case the patient is not scheduled via Modality Worklist. Patient demographics have to be entered at the instrument itself or imported via USB interface.

The situation is akin to the case if the Modality Worklist AE could not be reached due to network issues.



Main activities are initiated by an operator. The sequence diagram shows different phases. An operator triggers the activities in the planning phase (Import IOLMaster or FCW Scheduling Object via USB, FCW Scheduling Object via WLAN, CSV Import or add patient manually) and the export phase (Surgery export).

Add or import patient

The operator can create a new patient using the “New Patient” activity. Another way to add patients to the application is to import them via the USB or WLAN interface. The application offers an import form csv file or a DICOM file which is filled with IOLMaster data and optionally with surgery planning data.

Surgery

The operator can start surgeries. To activate this function the laterality of the examined eye has to be set.

Acquire media during surgery

The operator can take videos, still images and OCT data during the surgery.

Create surgery report

The CALLISTO eye automatically creates surgery report at the moment the surgery is stopped.

Store media (images, videos, OCT data and surgery report)

This is an optional activity.

The operator selects the studies which shall be exported from a pick list.

The CALLISTO eye sends a verification request to all configured remote AEs. The goal is to check the availability of the remote AEs that are needed for export process step (Storage). A failed check will cause an Auto-Connect request if Auto-Connect is enabled in DICOM configuration.

All acquired images, videos, OCT data and the surgery report for FCW of the selected studies are sent to the configured Storage Provider. The storage progress is reflected in a dialog.

4.2 AE Specifications

4.2.1 CALLISTO eye AE Specification

4.2.1.1 SOP Classes

Table 4-1 SOP Classes for CALLISTO eye AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	Yes	Yes
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	Yes	No
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	Yes	No
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	Yes	Yes
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Yes	No
Storage Commitment Push Model	1.2.840.10008.1.20.1	Yes	No

4.2.1.2 Associations Policies

4.2.1.2.1 General

The DICOM standard Application Context Name for DICOM 3.0 is always proposed:

Table 4-2 DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1

4.2.1.2.2 Number of Associations

The number of simultaneous associations can be two. At a time there may be one outgoing association and one incoming association.

Table 4-3 Number of associations

Maximum number of simultaneous associations	2

4.2.1.2.3 Asynchronous Nature

CALLISTO eye Application Software does not support asynchronous communication (multiple outstanding transactions over a single Association).

4.2.1.2.4 Implementation Identifying Information

Table 4-4 DICOM implementation class and version

Implementation Class UID	1.2.276.0.75.2.5.20
Implementation Version Name	NIM-2.11.0

4.2.1.3 Association Initiation Policy

4.2.1.3.1 Activity – Verify Communication

4.2.1.3.1.1 Description and Sequencing of Activities

This activity is available during the configuration phase. It facilitates the setup and management of the DICOM Application Entities.

The user can test the application level communication between instrument's software Application Entity and its peer DICOM Application Entities. During one test call, all peer DICOM Application Entities are contacted.

In the association request CALLISTO eye Application Software proposes not only Verification SOP Class, but also all other SOP Classes as supported by the instrument's DICOM interface.

The association is established when the peer DICOM entity accepts the verification related presentation context. In a sub-sequent step a C-ECHO message is exchanged.

The results of the "Verify Communication" activity are shown to the user as success or failure. For e. g. a Storage Provider not only the Verification information is evaluated, but also the acceptance of the proposed presentation context comprising the respective Storage SOP Classes.

To test the configured CALLISTO eye port a storage commitment request is sent to the Storage Commitment AE.
To indicate the test as successful, the application expects in the N-ACTION-RSP the Command set "Success" and a Storage Commitment Response Object.

In the case no response arrives (five retries are done with one retry per second) the state of the test is "failed".

The configuration of the Storage Commitment AE cannot be done via GUI. The same configuration as for Storage AE is used.

4.2.1.3.1.2 Proposed Presentation Contexts

Following presentation contexts are offered for each initiated association. During this activity the Application Software uses only

- Verification with Transfer Syntax ILE as SCU

Table 4-5 Proposed Presentation Contexts for Activity Verify Communication

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID 1.2.840.10008. ...**	**Name List**	**UID List 1.2.840.10008. ...**		
Verification	1.1	ILE	1.2	BOTH	None
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	None
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	BOTH[2)]	None
		ELE	1.2.1	BOTH[2)]	None
Ophthalmic Photography 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	SCU	None
		MPEG-4	1.2.4.102	SCU	None
Ophthalmic Tomography Image Storage	5.1.4.1.1.77.1.5.4	ILE	1.2	SCU	None
		ELE	1.2.1	SCU	None
Study Root Query/Retrieve IM - FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes[1)]
Study Root Query/Retrieve IM - MOVE	5.1.4.1.2.2.2	ILE	1.2	SCU	None
Modality Worklist IM – FIND	5.1.4.31	ILE	1.2	SCU	None

Note 1: C-FIND extended negotiation is offered. Relational-query support is required by the SCP.

Note 2: Only acts as SCP when a C-Move-RQ was initiated first and this association is still open.

4.2.1.3.1.3 SOP Specific Conformance for Verification SOP Class

The CALLISTO eye Application Software provides standard conformance.

4.2.1.3.2 Activity – Query Modality Worklist

4.2.1.3.2.1 Description and Sequencing of Activities

Default Query for scheduled patients

The Application Software always performs a query with predefined query keys. The operator cannot change the query key values. The applied query keys are:

Table 4-6 Modality Worklist Query

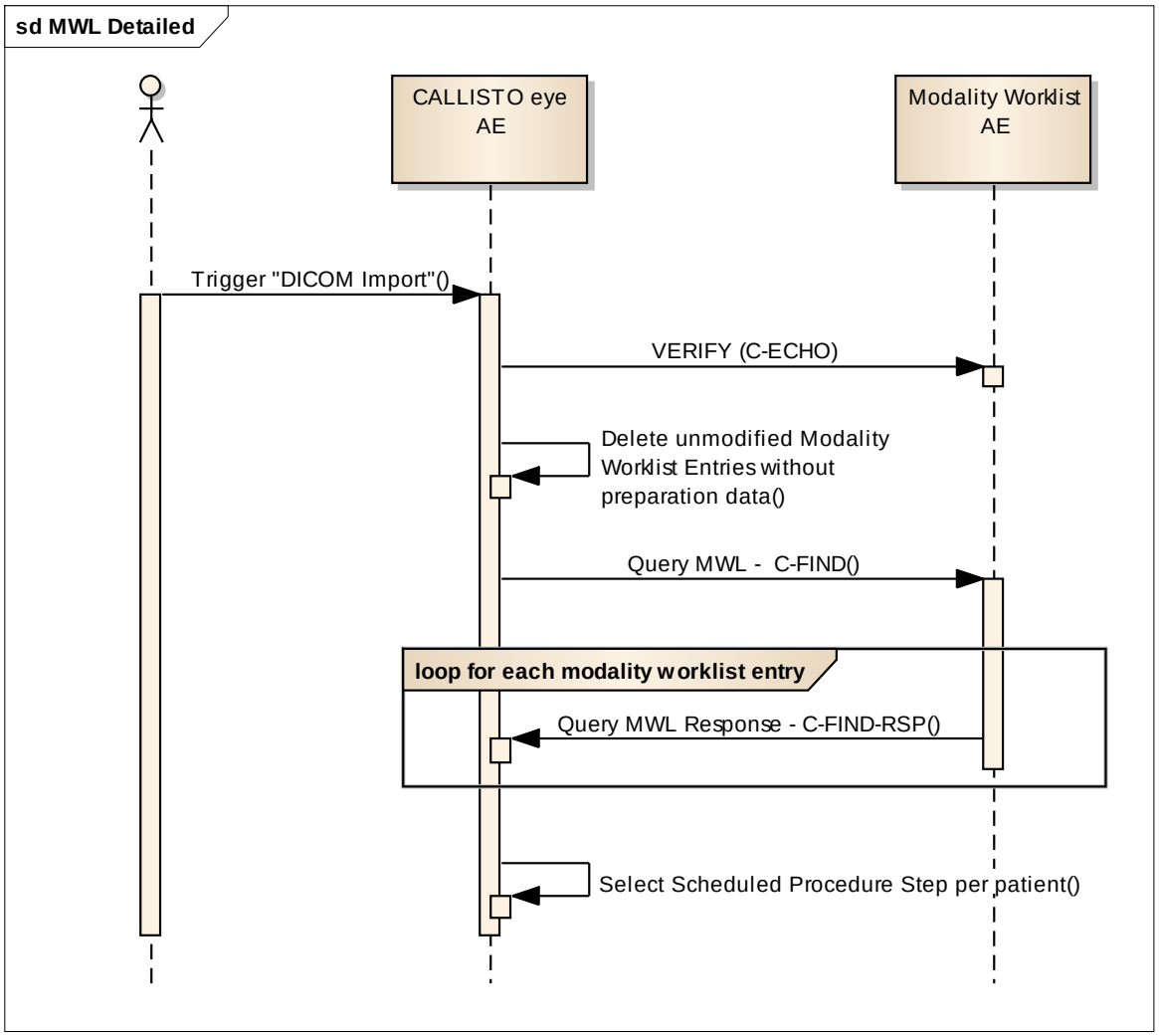
Tag	Attribute Name	Description
(0040,0100)	Scheduled Procedure Step Sequence	
>(0040,0001)	Scheduled Station Application Entity Title	Uses the value as configured for the CALLISTO eye instrument.
>(0040,0002)	Scheduled Procedure Step Start Date	Uses the date range of today + 3 days

All matching worklist items are subject to be imported into the local database.

CALLISTO eye only supports one Scheduled Procedure Step per Requested Procedure and one Requested Procedure per patient in the active Modality Worklist.

In case of more than one Scheduled Procedure Steps the earliest Scheduled Procedure Step is imported and linked to the current surgery.
Example:
One Scheduled Procedure Step is scheduled for Monday, 10:00 AM (=SPS_1) and the other Scheduled Procedures Step is scheduled for Monday, 11:00 AM (=SPS_2). Current time is Monday, 10:30 AM. SPS_1 is imported, SPS_2 is ignored.

After the query modality worklist activity the query and retrieve of the FCW Scheduling Object is automatically started.



Trigger "DICOM Import"

The activity "DICOM Import" can be triggered by operator at any time if no other activity is in progress. It is meaningful to perform the query when the patient arrives at the modality. So the worklist contains latest information.

Verify

After the operator triggers the “DICOM Import” this activity is automatically executed. The goal is to check the availability of the remote AEs and reduce the probability to start the preparation activities of the DICOM import feature without having information about the corresponding AE. In case the verification is not successful, the complete import procedure will be stopped. A message is shown to the operator.

Delete unmodified Modality Worklist Entries without preparation object

Already imported modality worklist entries (which correspond to a patient entry in the Patient Administration GUI) are deleted. The deletion is only done for those entries which have no additional data compared with the state of the import. The deletion is not done for those entries which have preparation data. This is independent on whether the preparation data were imported or entered by the user. Specifically this means that for the patient no preparation data exists or no surgery was already done.

The deletion is done to remove patients from the Patient Administration which were scheduled but not prepared or treated. Aim is to avoid needlessly growing patient lists.

Query Modality Worklist

After the deletion of unused modality worklist entries, the query modality worklist request is automatically started by the application. Also the query keys are set automatically.

Select Scheduled Procedure Step per patient

Import one patient per Scheduled Procedure Step

One patient can have more than one scheduled procedure step. The application however can only import one scheduled procedure step per patient. Therefore the scheduled procedure steps are sorted by date and time. The earliest scheduled procedure step is imported. The decision is not shown to the operator.

Verify if patient already exists

The Application Software checks the local database for patient data with same combination of Patient ID and Issuer of Patient ID. The check is only done for patients which were imported via Modality Worklist. In case the combination of Patient ID and Issuer of Patient ID already exists, the import of this current patient dataset will be stopped. The Modality Worklist import continues.

In case the Patient ID and/or the Issuer of Patient ID has not been set, the current patient data set will be imported via Modality Worklist without further checks.

4.2.1.3.2.2 Proposed Presentation Contexts

Following presentation contexts are offered for each initiated association. During this activity the Application Software uses only

- Verification with Transfer Syntax ILE as SCU
- "Modality Worklist Information Model - FIND" with Transfer Syntax ILE as SCU

Table 4-7 Proposed Presentation Contexts for Activity Query Modality Worklist

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID 1.2.840.10008. ...**	**Name List**	**UID List 1.2.840.10008. ...**		
Verification	1.1	ILE	1.2	BOTH	None
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	None
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	BOTH[2)]	None
		ELE	1.2.1	BOTH[2)]	None

Ophthalmic Photography 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	SCU	None
		MPEG-4	1.2.4.102	SCU	None
Ophthalmic Tomography Image Storage	5.1.4.1.1.77.1.5.4	ILE	1.2	SCU	None
		ELE	1.2.1	SCU	None
Study Root Query/Retrieve IM - FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes[1)]
Study Root Query/Retrieve IM - MOVE	5.1.4.1.2.2.2	ILE	1.2	SCU	None
Modality Worklist IM – FIND	5.1.4.31	ILE	1.2	SCU	None

Note 1: C-FIND extended negotiation is offered. Relational-query support is required by the SCP.

Note 2: Only acts as SCP when a C-Move-RQ was initiated first and this association is still open.

4.2.1.3.2.3 SOP Specific Conformance for Modality Worklist SOP Class

Table 4-8 Modality Worklist C-FIND Response Status Handling Behavior

Service Status	Further Meaning	Status Code	Behavior
Failure	Refused: Out of Resources	A700	Log message and display user alert message.
Failure	Identifier Does Not Match SOP Class	A900	Log message and display user alert message.
Failure	Unable to process	C000-CFFF	Log message and display user alert message.
Failure	Refused: SOP class not supported	0122	Log message and display user alert message.
Cancel	Matching terminated due to Cancel request	FE00	Log message.
Success	Matching is complete	0000	The Software Application stops receiving worklist items and continues the import procedure.
Pending	Matches are continuing – Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys	FF00	Log message. The Application Software checks whether the number of received worklist items overstepped the limit of 500 items. If the number of received worklist items overstepped the limit, then the Application Software sends a C-CANCEL-RQ and then an A-RELEASE-RQ to the service provider.
Pending	Matches are continuing – Warning that one or more Optional Keys were not supported for existence and / or matching for this Identifier	FF01	Log message. The Application Software checks whether the number of received worklist items overstepped the configurable limit. If the number of received worklist items overstepped the limit, then the Application Software sends a C-CANCEL-RQ and then an A-RELEASE-RQ to the service provider.
Unknown	All other responses with	xxxx	Log message and display user alert message.

	unknown code meaning		

Table 4-9 Attributes involved in Modality Worklist C-FIND request and response

Tag	Tag Name	Query Key	Imported	Displayed	Modifiable	SOP Instance
Scheduled Procedure Step (SPS)						
(0040,0100)	Scheduled Procedure Step Sequence		X			
>(0040,0001)	Scheduled Station Application Entity Title	AUTO	X			
>(0040,0003)	Scheduled Procedure Step Start Time		X			
>(0040,0002)	Scheduled Procedure Step Start Date	AUTO	X			
>(0008,0060)	Modality		X			
>(0040,0006)	Scheduled Performing Physicians Name		X			
>(0040,0007)	Scheduled Procedure Step Description		X			X
>(0040,0010)	Scheduled Station Name		X			
>(0040,0011)	Scheduled Procedure Step Location		X			
>(0040,0008)	Scheduled Protocol Code Sequence		X			X
>>(0008,0100)	Code Value		X			X
>>(0008,0102)	Coding Scheme Designator		X			X
>>(0008,0103)	Coding Scheme Version		X			X
>>(0008,0104)	Code Meaning		X			X
>(0040,0012)	Pre-Medication		X			
>(0040,0009)	Scheduled Procedure Step ID		X			X
>(0032,1070)	Requested Contrast Agent		X			
Requested Procedure						
(0040,1001)	Requested Procedure ID		X			X
(0032,1060)	Requested Procedure Description		X			X
(0032,1064)	Requested Procedure Code Sequence		X			X
>(0008,0100)	Code Value		X			X
>(0008,0102)	Coding Scheme Designator		X			X
>(0008,0103)	Coding Scheme Version		X			X
>(0008,0104)	Code Meaning		X			X
(0020,000D)	Study Instance UID		X			X
(0008,1110)	Referenced Study Sequence		X			X
>(0008,1150)	Referenced SOP Class UID		X			X
>(0008,1155)	Referenced SOP Instance UID		X			X
(0040,1003)	Requested Procedure Priority		X			
(0040,1004)	Patient Transport Arrangements		X			
(0040,1400)	Requested Procedure Comments		X			

Imaging Service Request						
(0008,0050)	Accession Number		X			X
(0032,1032)	Requesting Physician		X			
(0008,0090)	Referring Physicians Name		X			X
Visit Identification						
(0038,0010)	Admission ID		X			
Visit Status						
(0038,0300)	Current Patient Location		X			
Visit Relationship						
(0008,1120)	Referenced Patient Sequence		X			
>(0008,1150)	Referenced SOP Class UID		X			
>(0008,1155)	Referenced SOP Instance UID		X			
Patient Identification						
(0010,0010)	Patients Name		X	APP		X
(0010,0020)	Patients ID		X	APP		X
(0010,0021)	Issuer of Patient ID		X			X
(0010,1000)	Other Patient IDs		X			X
Patient Demographic						
(0010,0030)	Patients Birth Date		X	APP		X
(0010,0040)	Patients Sex		X	APP		X
(0010,1030)	Patients Weight		X			
(0040,3001)	Confidentiality Constraint on Patient Data Description					
(0010,4000)	Patients Comments		X			X
Patient Medical						
(0038,0500)	Patient State		X			
(0010,21C0)	Pregnancy Status		X			
(0010,2000)	Medical Alerts		X			
(0038,0050)	Special Needs		X			

Values of column “Query Key”:

AUTO

A tag marked with AUTO has a value assigned automatically by the application.

Values of column “Imported”:

X

The value gets imported in the application.

Values of column “Displayed”:

APP

Values of this tag are visible in the application.

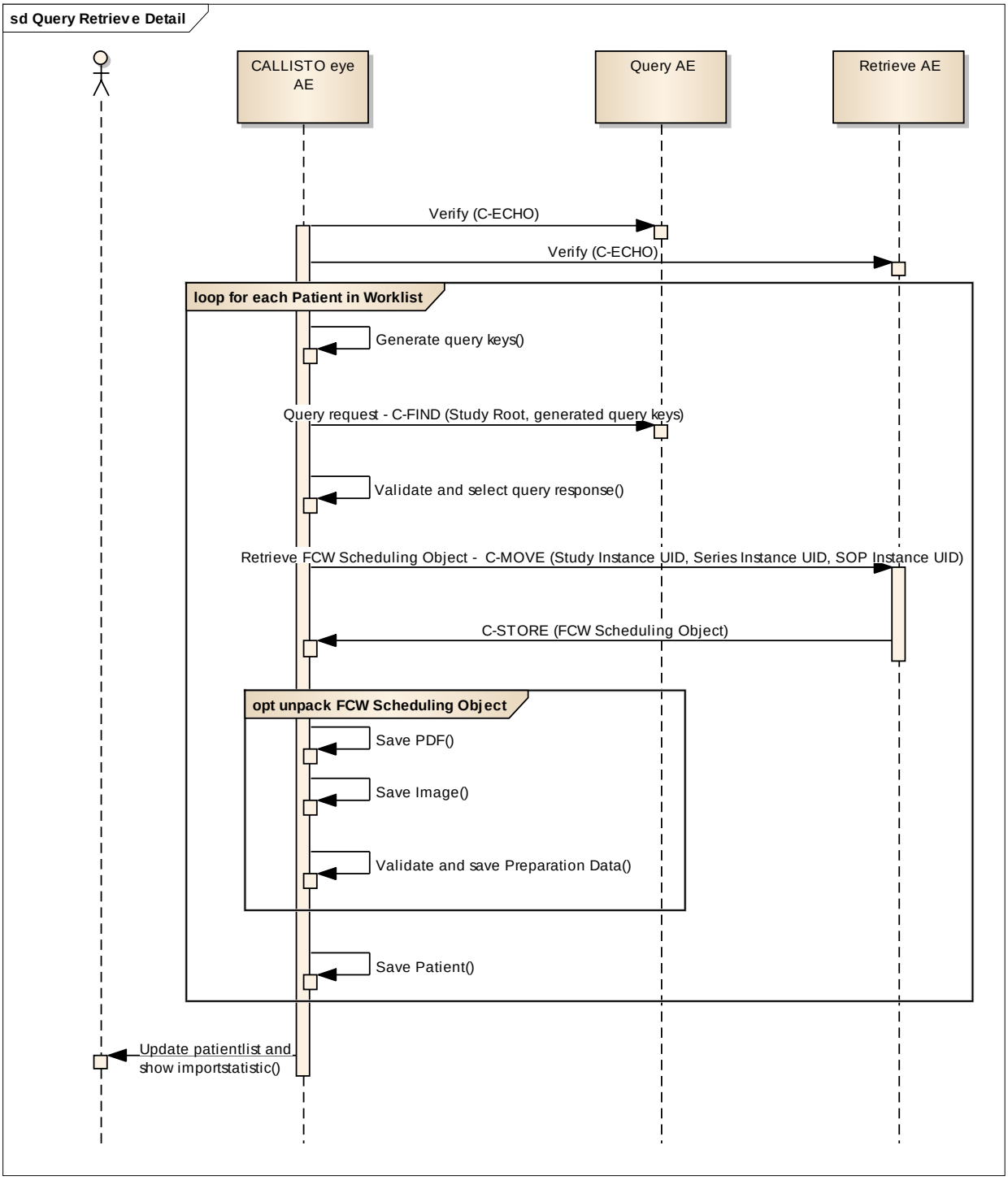
Values of column SOP Instance:

X

Values of marked tags will be stored in created SOP Instances. See also table in chapter 8.1.3 Attribute Mapping.

4.2.1.3.3 Activity – Query and retrieve latest FCW Scheduling Object

4.2.1.3.3.1 Description and Sequencing of Activities



Verify

In case the verification is not successful, the complete import procedure will be stopped. A message is shown to the operator.

Generate query keys

The activity is automatically triggered after the modality worklist activity. The Application software sends DICOM C-FIND request using relational Study Root Query/Retrieve SOP Class on INSTANCE level with the following attributes as query keys:

- (0010,0010) Patient's Name = "Patient's Name of MWL response"
- (0010,0020) Patient ID = "Patient ID of MWL response"
- (0010,0021) Issuer of Patient ID = "Issuer of Patient ID of MWL response"
- (0010,0030) Patient's Birth Date = "Patient's Birth Date of MWL response"
- (0008,1090) Manufacturer's Model Name = "FORUM Cataract Workplace*"
- (0008,0016) SOP Class UID = "1.2.840.10008.5.1.4.1.1.66" (Raw Data Storage)

CALLISTO eye only accepts one FCW Scheduling Object per patient. For further details see below.-

The query request is done for every Modality Worklist entry.

Validate and select query response

In case there is no response the application stops the import process for this Modality Worklist entry.

The CALLISTO eye application can receive more than one response per patient. In case there are more responses the application selects the response depending on the value of the attribute Acquistion Datetime (0008,002A). The response with the latest Acquistion Datetime is selected.

The CALLISTO eye application filters the response from the Query AE for supported instances. The following elements of a response item are evaluated and filtered:

- PatientName
- PatientID
- IssuerOfPatientID
- Birthdate

All parameters are compared with the input parameters of the query request. In case they do not match the application stops the import for this Modality Worklist entry, logs the information and refuses the import of the patient dataset.

Retrieve FCW Scheduling Object

In case the query response request was successfully validated and one response was selected a retrieve request is sent to get the Raw Data Storage (FCW Scheduling Object) dataset.

Save PDF

The FCW Scheduling Object can contain an IOLMaster dataset. In this case the PDF report is stored in the application.

Save Image

The FCW Scheduling Object can contain one or two referenced images. In this case the images are stored in the application.

Validate and save Preparation Data

The FCW Scheduling Object can contain planning data.

The data of the FCW Scheduling Object is validated, before the data is stored in the application. In case the validation is successful the data is stored in patient's

preparation for surgery. Otherwise the complete planning data of the FCW Scheduling Object is rejected.

Retrieve latest FCW Scheduling Object

The CALLISTO eye AE automatically retrieves the latest FCW Scheduling Object coming from the Study Root Query results. This step only happens when at least one FCW Scheduling per patient was found.

Save Patient

In case no errors occur during the complete DICOM Import activity the patient is stored in the database of the application. In case of errors the reason is logged and the patient is refused. Also the previously imported media will be removed.

Update Patient List and show Import Statistics

At the end of the DICOM Import procedure the application updates the GUI. Also a dialog is shown which contains information about the number of imported and the number of not imported patients.

4.2.1.3.3.2 Proposed Presentation Contexts

Following presentation contexts are offered for each initiated association. During this activity the Application Software uses only

- Study Root Q/R Information Model – FIND with Transfer Syntax ILE
- Study Root Q/R Information Model - MOVE with Transfer Syntax ILE

Table 4-10 Proposed Presentation Contexts for Activity Query and retrieve latest FCW Scheduling Object

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID 1.2.840.10008. ...**	**Name List**	**UID List 1.2.840.10008. ...**		
Verification	1.1	ILE	1.2	BOTH	None
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	None
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	BOTH[2)]	None
		ELE	1.2.1	BOTH[2)]	None
Ophthalmic Photography 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	SCU	None
		MPEG-4	1.2.4.102	SCU	None
Ophthalmic Tomography Image Storage	5.1.4.1.1.77.1.5.4	ILE	1.2	SCU	None
		ELE	1.2.1	SCU	None
Study Root Query/Retrieve IM - FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes[1)]
Study Root Query/Retrieve IM - MOVE	5.1.4.1.2.2.2	ILE	1.2	SCU	None
Modality Worklist IM – FIND	5.1.4.31	ILE	1.2	SCU	None

Note 1: C-FIND extended negotiation is offered. Relational-query support is required by the SCP.

Note 2: Only acts as SCP when a C-Move-RQ was initiated first and this association is still open.

4.2.1.3.3.3 SOP Specific Conformance for Study Root Query/Retrieve SOP Class as SCU

Table 4-11 Query C-FIND Response Status Handling Behavior

Service Status	Further Meaning	Status Code	Behavior
Failure	Refused: Out of Resources	A700	Log message and display user alert message.
Failure	Identifier does not match SOP Class	A900	Log message and display user alert message.
Failure	Unable to process	C000-CFFF	Log message and display user alert message.
Failure	Refused: SOP class not supported	0122	Log message and display user alert message.
Cancel	Matching terminated due to Cancel request	FE00	Log message.
Success	Matching is complete – No final Identifier is supplied	0000	The Software Application stops receiving worklist items.
Pending	Matches are continuing – Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys	FF00	Log message. The Application Software checks whether the number of received worklist items overstepped the configurable limit. If the number of received worklist items overstepped the limit, then the Application Software sends a C-CANCEL-RQ and then an A-RELEASE-RQ to the service provider.
Pending	Matches are continuing – Warning that one or more Optional Keys were not supported for existence and / or matching for this Identifier.	FF01	Log message. The Application Software checks whether the number of received worklist items overstepped the configurable limit. If the number of received worklist items overstepped the limit, then the Application Software sends a C-CANCEL-RQ and then an A-RELEASE-RQ to the service provider.
Unknown	All other responses with unknown code meaning	xxxx	Log message and display user alert message.

Table 4-12 Retrieve C-MOVE Response Status Handling Behavior

Service Status	Further Meaning	Status Code	Behavior
Failure	Refused: Out of Resources – Unable to calculate number of matches	A701	Log message and display user alert message.
Failure	Refused: Out of Resources – Unable to perform sub-operations	A702	Log message and display user alert message.

Failure	Refused: Move Destination unknown	A801	Log message and display user alert message.
Failure	Identifier does not match SOP Class	A900	Log message and display user alert message.
Failure	Unable to Process	C000-CFFF	Log message and display user alert message.
Failure	Refused: SOP class not supported	0122	Log message and display user alert message.
Cancel	Sub-operations terminated due to Cancel Indication	FE00	Log message.
Warning	Sub-operations Complete – One or more Failures	B000	Log message and display user alert message.
Success	Matching is complete – No final Identifier is supplied	0000	The Application Software returns from this activity and saves the retrieved objects in the application.
Pending	Matches are continuing – Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys	FF00	This is not expected since the Application software calls C-MOVE instance by instance.
Unknown	All other responses with unknown code meaning	xxxx	Log message and display user alert message.

Table 4-13 STUDY level keys for the Study Root Query/Retrieve Information Model (request and response)

Tag	Tag Name	Query Key	Imported	Displayed	Modifiable	SOP Instance
(0010,0010)	Patient's Name	X		APP		
(0010,0020)	Patient ID	X		APP		
(0010,0021)	Issuer of Patient ID	X				
(0010,0030)	Patient's Birth Date	X		APP		
(0010,0032)	Patient's Birth Time					
(0010,0040)	Patient's Sex			APP		
(0010,1000)	Other Patient IDs					
(0010,2160)	Ethnic Group					
(0010,4000)	Patient Comments					

(0008,0020)	Study Date					
(0008,0030)	Study Time					
(0008,0050)	Accession Number					
(0008,0061)	Modalities in Study					
(0008,0090)	Referring Physician's Name					
(0020,0010)	Study ID					
(0020,000D)	Study Instance UID					

Table 4-14 SERIES level keys for the Study Root Query/Retrieve Information Model (request and response)

Tag	Tag Name	Query Key	Imported	Displayed	Modifiable	SOP Instance
(0008,0060)	Modality					
(0020,0011)	Series Number					
(0020, 000E)	Series Instance UID					
(0040, 0275)	Request Attribute Sequence					
>(0040,1001)	Requested Procedure ID					
>(0040,0009)	Scheduled Procedure Step ID					
(0040,0244)	Performed Procedure Step Start Date					
(0040,0245)	Performed Procedure Step Start Time					
(0008,1090)	Manufacturer's Model Name	X				

Table 4-15 INSTANCE level keys for the Study Root Query/Retrieve Information Model (request and response)

Tag	Tag Name	Query Key	Imported	Displayed	Modifiable	SOP Instance
(0008,002A)	Acquisition Date Time					
(0020,0013)	Instance Number					
(0008,0016)	SOP Class UID	X				
(0008,0018)	SOP Instance UID					
(0042,0010)	Document Title					

Values of column "Query Key":

X

The attribute is used as query key. The value is set automatically by the application.

Values of column "Displayed":

APP

Values of this tag are visible in the application.

Values of column SOP Instance:

X

Values of marked tags will be stored in created SOP Instances. See also table "mapping of attributes" in 8.1.3 Attribute Mapping.

Table 4-16 Query key details

Tag	Tag Name	Description
(0010,0010)	Patient's Name	The value is copied from MWL. This is a DICOM Standard query key on Patient level.
(0010,0020)	Patient ID	The value is copied from MWL. This is a DICOM Standard query key on Patient level.
(0010,0021)	Issuer of Patient ID	The value is copied from MWL. This is a DICOM Optional query key on Patient level, thus the effect of this query key on the query depends on Service Provider implementation.
(0010,0030)	Patient's Birth Date	The value is copied from MWL. This is a DICOM Optional query key on Patient level, thus the effect of this query key on the query depends on Service Provider implementation.
(0008,1090)	Manufacturer's Model Name	The value is always FORUM Cataract Workplace*. This is a DICOM Optional query key on Series level, thus the effect of this query key on the query depends on Service Provider implementation.
(0008,0016)	SOP Class UID	The value is always 1.2.840.10008.5.1.4.1.1.66 (Raw Data Storage). This is a DICOM Optional query key on Instance level, thus the effect of this query key on the query depends on Service Provider implementation.

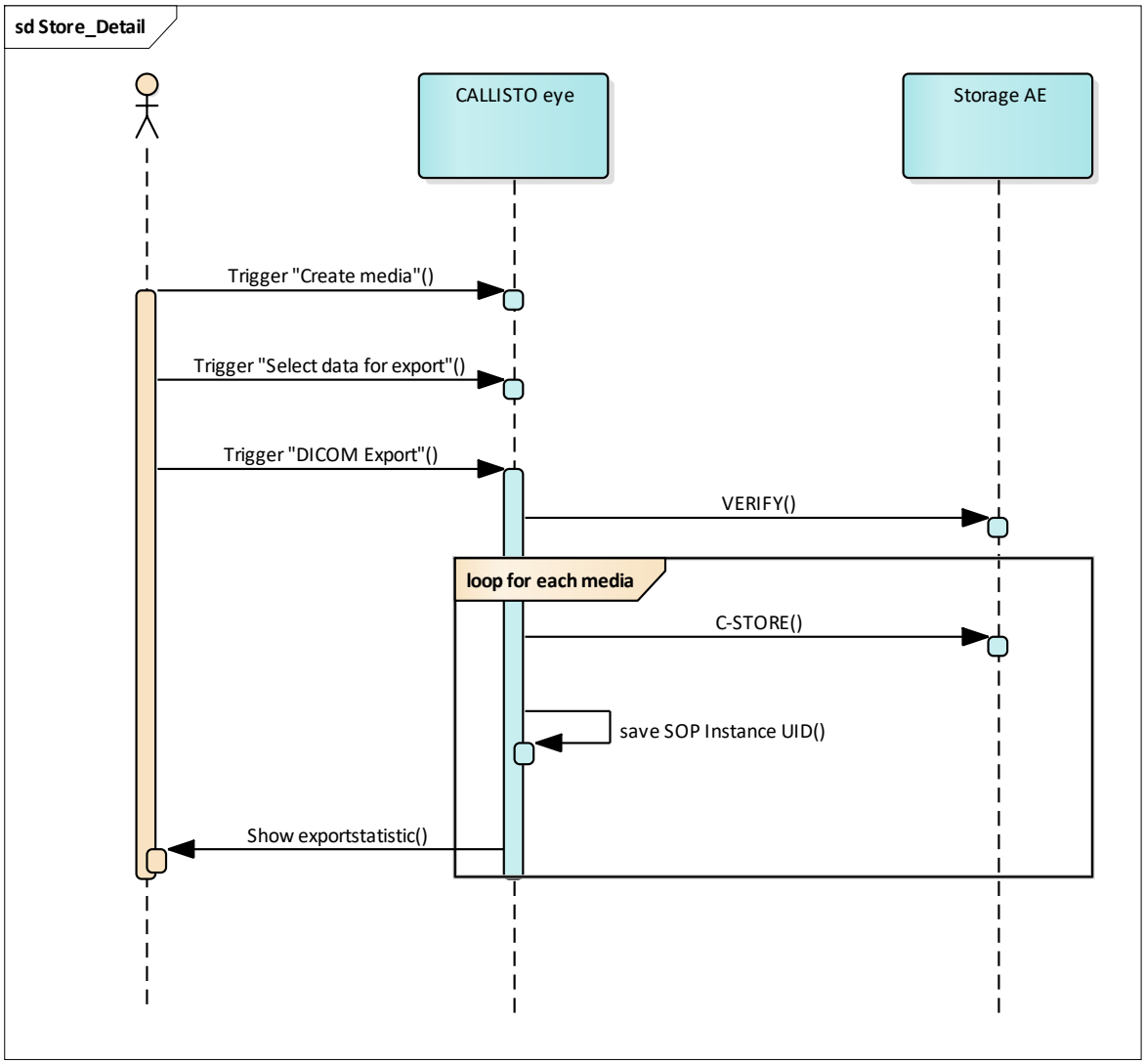
4.2.1.3.4 Activity – Store media (images, videos, OCT captures and surgery report)

This activity is triggered by the operator. During the execution of the activity all other features of the application are inaccessible. The operator has the opportunity to cancel the activity.

Export can either be done for patients which are imported by the Modality Worklist workflow, imported by USB (IOLMaster data or CSV) or manually created by the operator. The following data will not be exported to the DICOM Archive:

- imported media from IOLMaster
- imported patients via USB (DICOM files)
- imported patients via WLAN

4.2.1.3.4.1 Description and Sequencing of Activities



Trigger "Create media"

This activity is triggered by the operator. This activity has no direct relation to DICOM messaging. During this activity, the Application software creates image, video, and OCT data. In addition the study report is created. The existence of media data which were created by the application is basis of the DICOM Export activity.

Trigger "Select data for export"

The application provides a GUI where the operator can select the data he wants to export. The GUI supports the selection of surgeries. This is the smallest unit the operator can select to export. A surgery is a container (a DICOM study) which holds all media data stored between a surgery start and stop. The operator can select between one and 500 studies.

Trigger "DICOM Export"

The DICOM Export will become active as soon as one study is selected. During the export activity all other features of the application are inaccessible. A dialog containing

the actual state of progress is shown to the operator. Also a “Cancel” Button is offered in case the operator wants to stop the export.

For every selected study the application exports all its media data.

Each media has a unique SOP Instance UID over its entire life time. The SOP Instance UID will not be recreated upon repeated export.

Verify

In case the verification is not successful, the complete export procedure will be stopped. A message is shown to the operator.

Show Export statistic

After sending all media of the selected surgeries to the DICOM Archive a dialog is shown. The dialog contains information about the number of successfully, partially and not exported studies. Additionally all media that could not be exported will be shown.

4.2.1.3.4.2 Proposed Presentation Contexts

Following presentation contexts are offered for each initiated association. During this activity the Application Software uses only

- OP 8Bit Image Storage with Transfer Syntax JPG-1 as SCU for snapshots and OCT scan location marker
- OP 8Bit Image Storage with Transfer Syntax MPEG-4 as SCU for HD videos
- OP Tomography Image Storage with Transfer Syntax ILE/ELE as SCU for OCT captures
- Raw Data Storage with Transfer Syntax ILE/ELE as SCU for CallistoSurgeryReportRawData

Table 4-17 Proposed Presentation Contexts for Activity Store media

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID 1.2.840.10008. ...**	**Name List**	**UID List 1.2.840.10008. ...**		
Verification	1.1	ILE	1.2	BOTH	None
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	None
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	BOTH[2)]	None
		ELE	1.2.1	BOTH[2)]	None
Ophthalmic Photography 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	SCU	None
		MPEG-4	1.2.4.102	SCU	None
Ophthalmic Tomography Image Storage	5.1.4.1.1.77.1.5.4	ILE	1.2	SCU	None
		ELE	1.2.1	SCU	None
Study Root Query/Retrieve IM - FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes[1)]
Study Root Query/Retrieve IM - MOVE	5.1.4.1.2.2.2	ILE	1.2	SCU	None
Modality Worklist IM – FIND	5.1.4.31	ILE	1.2	SCU	None

Note 1: C-FIND extended negotiation is offered. Relational-query support is required by the SCP.

Note 2: Only acts as SCP when a C-Move-RQ was initiated first and this association is still open.

4.2.1.3.4.3 SOP Specific Conformance for Storage SOP Classes

Table 4-18 Storage C-STORE Response Status Handling Behavior

Service Status	Further Meaning	Status Code	Behavior
Failure	Refused: Out of Resources	A700-A7FF	Log message and display user alert message.
Failure	Error: Data Set does not match SOP Class	A900-A9FF	Log message and display user alert message.
Failure	Error: Cannot understand	C000-CFFF	Log message and display user alert message.
Failure	Refused: SOP class not supported	0122	Log message and display user alert message.
Warning	Coercion of data Elements	B000	The Application Software logs this event and continues storing next instance if there is at least one instance left in the set of instances.
Warning	Data Set does not match SOP Class	B007	The Application Software logs this event and continues storing next instance if there is at least one instance left in the set of instances.
Warning	Elements Discarded	B006	The Application Software logs this event and continues storing next instance if there is at least one instance left in the set of instances.
Success	Successful Storage	0000	Log message. The Application Software continues storing next instance if there is at least one instance left in the set of instances.
DUPLICATED SOP INSTANCE UID	SOP Instance UUI already exists	0111	The Application Software logs this event and continues storing next instance if there is at least one instance left in the set of instances. Display user alert message.
UNABLE TO CONNECT TO REMOTE ENTITY	Connection failed	NIMErrorCodes: STATUS_UNABLE_TO_CONNECT_TO_REMOTE_ENTITY	Log message and display user alert message.
DIMSE RESPONSE TIMEOUT	Storage response timeout	NIMErrorCodes: STATUS_DIMSE_RESPONSE_TIMEOUT	The Application Software logs this event and continues storing next instance if there is at least one instance left in the set of instances. Display user alert message.
Unknown	All other responses with unknown code	xxxx	Log message and show user alert.

4.2.1.4 Association Acceptance Policy

4.2.1.4.1 Activity – Verify Communication

The activity can be performed at any time. The service is available as soon as the Application Software has been started.

4.2.1.4.1.1 Description and Sequencing of Activities

The Software AE responds to verification requests made by remote AEs.

4.2.1.4.1.2 Accepted Presentation Contexts

Table 4-19 Accepted Presentation Contexts for Activity Verify Communication

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID 1.2.840.10008. ...	Name List	UID List 1.2.840.10008. ...		
Verification	… 1.1	ILE	… 1.2	BOTH	None

4.2.1.4.1.3 SOP Specific Conformance for Verification SOP Class as SCP

The Application Software AE provides standard conformance.

4.2.1.4.2 Activity - Query and retrieve latest FCW Scheduling Object

This chapter describes the aspect of association acceptance of the activity “Query and retrieve latest FCW Scheduling Object”. The activity retrieves Raw Data Storage data belonging to a patient scheduled via Modality Worklist.

4.2.1.4.2.1 Description and Sequencing of Activities

The description and sequencing of activities covered by chapter “4.2.1.3.3 Activity – Query and retrieve latest FCW Scheduling Object”

4.2.1.4.2.2 Accepted Presentation Contexts

Table 4-20 Accepted Presentation Contexts for Activity Query and retrieve latest FCW Scheduling Object

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID 1.2.840.10008. ...	Name List	UID List 1.2.840.10008. ...		
Verification	1.1	ILE	1.2	BOTH	None
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	SCU	None
		ELE	1.2.1	SCU	None

4.2.1.4.2.3 SOP Specific Conformance for Storage SOP Class as SCP

The Application Software AE provides standard conformance.

4.3 Network Interfaces

4.3.1 Physical Network Interface

The physical network interface is not visible for the instrument application. The instrument application uses the communication stack as offered by the Operating System.

4.3.2 Additional Protocols

No additional protocols are supported.

4.3.3 IPv4 and IPv6 Support

No additional features are supported. IPv6 is not supported.

4.4 Configuration

Local application entity and remote application entity information can be configured with the Networking Configuration Tool.

4.4.1 AE Title/Presentation Address Mapping

The mapping from AE Title to TCP/IP addresses and ports is configurable and set at the time of installation by ZEISS Service.

4.4.1.1 Local AE Titles

The IP or alternatively the host name is configurable by the Application Software Configuration Tool. Also the Application Entity Title as well as the port number is configurable.

The default values are:

- Application Entity Title: CALLISTO1
- Port number: 5901

4.4.1.2 Remote AE Titles

The mapping of external AE Titles to TCP/IP addresses and ports is configurable. The CALLISTO eye Application Software allows setting up a remote Application Entity for each service. For all Application Entities, the host name or IP, the port and the Application Entity Title must be known.

The Default values are:

- Modality Worklist
  - Application Entity Title: CZMAMWL
  - IP-Address/Hostname: 192.168.99.1
  - Port: 11119
- Query
  - Application Entity Title: CZMA
  - IP- Address/Hostname: 192.168.99.1
  - Port: 11119
- Retrieve
  - Application Entity Title: CZMA
  - IP- Address/Hostname: 192.168.99.1
  - Port: 11119
- Storage
  - Application Entity Title: CZMA
  - IP- Address/Hostname: 192.168.99.1
  - Port: 11119

4.4.2 Parameters

4.4.2.1 General Parameters

The general parameters are shared for associations to any of the configured AE.

Table 4-21 Configuration Parameters Table

Parameter	Configurable (Yes/No)	Default Value
General Parameters		
DIMSE RSP Timeout	Yes	20 sec
Network Timeout	Yes	5 sec.
Max. Association Idle Time	Yes	30 sec
(0008,0080) Institution Name	Yes	NULL
(0008,0081) Institution Address	Yes	NULL
(0008,1040) Institutional Department Name	Yes	NULL
(0010,0021) Issuer of Patient ID	Yes	CALLISTO
(0008,1010) Station Name	Yes	NULL
Maximum Query Responses	Yes	500
AE Specific Parameters		
Number of simultaneous Associations by Service and/or SOP Class		2
Verification SCU Parameters		
No specific configuration required.		
Modality Worklist SCU Parameters		
Scheduled Station AE Title (value matches always with AE-Title in DICOM configuration GUI)	Yes	CALLISTO1
Study Root Q/R SCU Parameters		
Extended Negotiation – relational query support negotiation	No	
Storage Commitment SCU Parameters		
Storage SCU Parameters		
No specific configuration required.		
Storage SCP Parameters		
No specific configuration required The configuration of port number and Application Entity Title are part of the Local Application Entity setup (see 4.4.1.1 Local AE Titles).		
Verification SCP Parameters		
No specific configuration required The configuration of port number and Application Entity Title are part of the Local Application Entity setup (see 4.4.1.1 Local AE Titles).		

5 Media Interchange

Media Interchange is not scope of this document since Media Interchange is not supported by CALLISTO eye Application Software.

6 Support of Character Sets

All application entities described in the previous chapters support UTF-8 character set.

Table 6-1 Supported Character Set

Supported Specific Character Set	
Character Set Description	**Defined Term**
UTF-8 encoded Unicode	ISO_IR 192

7 Security

The DICOM capabilities of the CALLISTO eye Application Software do not support any specific security measures.

It is assumed that CALLISTO eye Application Software is used within a secured environment. It is assumed that a secured environment includes at a minimum:

- Firewall or router protections to ensure that only approved external hosts have network access to CALLISTO eye Application Software
- Firewall or router protections to ensure that CALLISTO eye Application Software only has network access to approved external hosts and services.
- Any communication with external hosts and services outside the locally secured environment use appropriate secure network channels (e.g. such as a Virtual Private Network (VPN))

Other network security procedures such as automated intrusion detection may be appropriate in some environments. Additional security features may be established by the local security policy and are beyond the scope of this conformance statement.

8 Annexes

8.1 IOD Contents

8.1.1 Created SOP Instance(s)

Abbreviations used for presence of values:

VNAP
Value Not Always Present (attribute sent zero length if no value is present) – Applicable for Type 2, 2C.

ANAP
Attribute is not always present – Applicable for Type 3

ALWAYS
Attribute is always present with a value – Applicable for Type 1

EMPTY
Attribute is sent without a value – Applicable for Type 2

Abbreviations used for sources of data:

USER
The attribute value source is from User input

AUTO
The attribute value is generated automatically

MWL
The attribute value is the same as the value received using a DICOM service such as Modality Worklist, Modality Performed Procedure Step, etc.

CONFIG
The attribute value source is a configurable parameter

IMPORT
Native import via DICOM, USB stick or csv.

8.1.1.1 Ophthalmic Photography 8 Bit Information Object Definition

IE	Module	References	Usage
Patient	Patient	Table 8-1 Common Modules - Module "Patient"	ALWAYS
	Clinical Trial Subject		NEVER
Study	General Study	Table 8-2 Common Modules - Module "General Study"	ALWAYS
	Patient Study		NEVER
	Clinical Trial Study		NEVER
Series	General Series	Table 8-3 Common Modules - Module "General Series"	ALWAYS
	Ophthalmic Photography Series	Table 8-5 Ophthalmic Photography 8 Bit Image IOD - Module "Ophthalmic Photography Series"	ALWAYS
	Clinical Trial Series		NEVER
Frame Of Reference	Synchronization	Table 8-6 Ophthalmic Photography 8 Bit Image IOD - Module “Synchronization"	ALWAYS
Equipment	General Equipment	Table 8-4 Common Modules - Module "General Equipment"	ALWAYS
Image	General Image	Table 8-7 Ophthalmic Photography 8 Bit Image IOD - Module “General Image"	ALWAYS
	Image Pixel	Table 8-8 Ophthalmic Photography 8 Bit Image IOD - Module “Image Pixel"	ALWAYS
	Enhanced Contrast/Bolus		NEVER
	Cine	Table 8-9 Ophthalmic Photography 8 Bit Image IOD - Module “Cine"	ALWAYS
	Multi-frame	Table 8-10 Ophthalmic Photography 8 Bit Image IOD - Module “Multi Frame"	ALWAYS
	Device		NEVER
	Acquisition Context		NEVER
	Ophthalmic Photography Image	Table 8-11 Ophthalmic Photography 8 Bit Image IOD - Module “Ophthalmic Photography Image"	ALWAYS
	Ocular Region Imaged	Table 8-12 Ophthalmic Photography 8 Bit Image IOD - Module “Ocular Region Imaged"	ALWAYS
	Ophthalmic Photography Acquisition Parameters	Table 8-13 Ophthalmic Photography 8 Bit Image IOD - Module “Ophthalmic Photography Acquisition Parameters"	ALWAYS
	Ophthalmic Photographic Parameters	Table 8-14 Ophthalmic Photography 8 Bit Image IOD - Module “Ophthalmic Photographic Parameters"	ALWAYS
	ICC Profile		NEVER
	SOP Common	Table 8-15 Ophthalmic Photography 8 Bit Image IOD - Module “SOP Common"	ALWAYS
	Frame Extraction		NEVER

8.1.1.2 Surgery Report (CallistoSurgeryReportRawData) - RAW Data IOD Definition

CALLISTO eye creates a surgery report (CallistoSurgeryReportRawData) in one format: a raw data instance. A RAW DATA IOD is used for the raw data instance.

In case new UIDs are created, they contain a constant prefix as follows:

- Study Instance UID: 1.2.276.0.75.2.5.90.25.1
- Series Instance UID: 1.2.276.0.75.2.5.90.25.2
- SOP Instance UID: 1.2.276.0.75.2.5.90.25.3

The Creator Version UID of the raw data instance identifies the equipment and version of the software that has created the Raw Data information. All Creator Version UID of one software version are equal.

- Creator Version UID: 1.2.276.0.75.2.5.90.25.6.<software version>

IE	Module	References	Usage
Patient	Patient	Table 8-1 Common Modules - Module "Patient"	ALWAYS
	Clinical Trial Subject		NEVER
Study	General Study	Table 8-2 Common Modules - Module "General Study"	ALWAYS
	Patient Study		NEVER
	Clinical Trial Study		NEVER
Series	General Series	Table 8-3 Common Modules - Module "General Series" Table 8-16 RAW Data IOD - Module "General Series"	ALWAYS
	Clinical Trial Series		NEVER
Frame Of Reference	Frame Of Reference		NEVER
	Synchronization		NEVER
Equipment	General Equipment	Table 8-4 Common Modules - Module "General Equipment"	ALWAYS
RAW Data	Acquisition Context	Table 8-17 RAW Data IOD - Module "Acquisition Context"	ALWAYS
	Specimen		NEVER
	Raw Data	Table 8-18 RAW Data IOD - Module "Raw Data"	ALWAYS
	SOP Common	Table 8-19 RAW Data IOD - Module "SOP Common"	ALWAYS

8.1.1.3 Ophthalmic Tomography Image Information Object Definition

IE	Module	References	Usage
Patient	Patient	Table 8-1 Common Modules - Module "Patient"	ALWAYS
	Clinical Trial Subject		NEVER
Study	General Study	Table 8-2 Common Modules - Module "General Study"	ALWAYS
	Patient Study		NEVER
	Clinical Trial Study		NEVER
Series	General Series	Table 8-3 Common Modules - Module "General Series" Table 8-20 Ophthalmic Tomography Image IOD - Module "General Series"	ALWAYS
	Clinical Trial Series		NEVER
	Ophthalmic Tomography Series	Table 8-21 Ophthalmic Tomography Image IOD - Module "Ophthalmic Tomography Series"	ALWAYS
Frame Of Reference	Frame Of Reference	Table 8-22 Ophthalmic Tomography Image IOD - Module "Frame Of Reference"	ALWAYS
	Synchronization	Table 8-23 Ophthalmic Tomography Image IOD - Module "Synchronization"	ALWAYS
Equipment	General Equipment	Table 8-4 Common Modules - Module "General Equipment"	ALWAYS
	Enhanced General Equipment		ALWAYS
Image	Image Pixel	Table 8-24 Ophthalmic Tomography Image IOD - Module "Image Pixel"	ALWAYS
	Enhanced Contrast/Bolus		NEVER
	Multi Frame Functional Groups	Table 8-25 Ophthalmic Tomography Image IOD - Module "Multi-Frame Functional Groups"	ALWAYS
	Multi Frame Dimension	Table 8-26 Ophthalmic Tomography Image IOD - Module "Multi-Frame Dimension"	ALWAYS
	Acquisition Context	Table 8-27 Ophthalmic Tomography Image IOD - Module "Acquisition Context"	ALWAYS
	Cardiac Synchronization		NEVER
	Ophthalmic Tomography Image	Table 8-28 Ophthalmic Tomography Image IOD - Module "Ophthalmic Tomography Image"	ALWAYS
	Ophthalmic Tomography Acquisition Parameters	Table 8-29 Ophthalmic Tomography Image IOD - Module "Ophthalmic Tomography Acquisition Parameters"	ALWAYS
	Ophthalmic Tomography Parameters	Table 8-30 Ophthalmic Tomography Image IOD - Module "Ophthalmic Tomography Parameters"	ALWAYS
	Ocular Region Imaged	Table 8-31 Ophthalmic Tomography Image IOD - Module "Ocular Region Imaged"	ALWAYS
	SOP Common	Table 8-32 Ophthalmic Tomography Image IOD - Module "SOP Common"	ALWAYS

	Frame Extraction		NEVER

8.1.1.4 Common Modules

Table 8-1 Common Modules - Module "Patient"

Attribute Name	Tag	VR	Value	PoV	Source
Patient's Name	(0010,0010)	PN	Patient's full name. In the scheduled case copied from MWL. In the unscheduled case use the patient's surname and forename.	VNAP	MWL, USER, IMPORT
Patient ID	(0010,0020)	LO	In the scheduled case copied from MWL. In the unscheduled case use patient's Patient-ID. (patient.externalID named Patient-ID in the GUI). In case the Patient-ID has no value in the moment the user records data, Patient-ID is set automatically by the application.	ALWAYS	MWL, AUTO, USER, IMPORT
Issuer of Patient ID	(0010,0021)	LO	In the scheduled case copied from MWL. In the unscheduled case copied from configuration. The field can be configured in DICOM Settings tab in the application's Control Center. Attribute is not sent when empty.	ANAP	MWL, CONFIG, IMPORT
Patient's Birth Date	(0010,0030)	DA	In the scheduled case copied from MWL. In the unscheduled case use patient's birthdate.	VNAP	MWL, USER, IMPORT
Patient's Sex	(0010,0040)	CS	In the scheduled case copied from MWL. In the unscheduled case use patient's gender.	VNAP	MWL, USER, IMPORT
Other Patient Names	(0010,1001)	PN	In the scheduled case copied from MWL In the unscheduled case attribute is not present.	ANAP	MWL
Ethnic Group	(0010,2160)	SH	In the unscheduled case attribute is not present	ANAP	MWL
Patient Comments	(0010,4000)	LT	In the unscheduled case attribute is not present	ANAP	MWL

Table 8-2 Common Modules - Module "General Study"

Attribute Name	Tag	VR	Value	PoV	Source
Study Instance UID	(0020,000D)	UI	In the scheduled case copied from MWL. In the unscheduled case the Study UID is created by the application. The Study UID is stored in the patient object. Every CALLISTO eye treatment uses same Study Instance UID within the study and its series. "1.2.276.0.75.2.5.90." is used as constant prefix to generate the UIDs.	ALWAYS	MWL, AUTO
Study Date	(0008,0020)	DA	In the scheduled case copied from MWL. If there is no value in the attribute Study Date or no value in the attribute Study Time, the value as described for the unscheduled case will set for this attribute. In the unscheduled case use the date the patient has been added to the application.	ALWAYS	MWL, AUTO
Study Time	(0008,0030)	TM	In the scheduled case copied from MWL. If there is no value in the attribute Study Date or no value in the attribute Study Time, the value as described for the unscheduled case will set for this attribute. In the unscheduled case use the time the patient has been added to the application.	ALWAYS	MWL, AUTO
Referring Physician's Name	(0008,0090)	PN	In the scheduled case copied from MWL. In the unscheduled case value is not present.	VNAP	MWL
Study ID	(0020,0010)	SH	In the scheduled case the value is copied from Requested Procedure ID from Modality Worklist. If there is no value, value as described for the unscheduled case will set for this attribute. In unscheduled case use internal database id of the patient (patient.patientID). Every CALLISTO eye treatment uses same Study ID within a study and its series. The treatment is always created in the moment the user presses the "Start treatment" button. (It's a technical value, not the displayed Patient-ID in the GUI.)	ALWAYS	MWL, AUTO
Accession Number	(0008,0050)	SH	In the scheduled case copied from MWL. In the unscheduled case value is not present.	VNAP	MWL
Study Description	(0008,1030)	LO	In the scheduled case the value is copied from Requested Procedure Description in MWL. In the unscheduled case attribute is not present.	ANAP	MWL
Referenced Study Sequence	(0008,1110)	SQ	In the scheduled case copied from MWL. In the unscheduled case attribute is not present.	ANAP	MWL
> Referenced SOP Class UID	(0008,1150)	UI	In the scheduled case copied from MWL.	ALWAYS	MWL

			In the unscheduled case attribute is not present.		
> Referenced SOP Instance UID	(0008,1155)	UI	In the scheduled case copied from MWL. In the unscheduled case attribute is not present.	ALWAYS	MWL
Procedure Code Sequence	(0008,1032)	SQ	Attribute is only present in the scheduled case. Information is copied from MWL from attribute (0032,1064) Requested Procedure Code Sequence. In the scheduled case copied from MWL. In the unscheduled case attribute is not present.	ANAP	MWL
> Include 'Code Sequence Macro'.			In the scheduled case copied from MWL. In the unscheduled case attribute is not present	ALWAYS	MWL

Table 8-3 Common Modules - Module "General Series"

Attribute Name	Tag	VR	Value	PoV	Source
Series Instance UID	(0020,000E)	UI	In the scheduled and unscheduled case the Study UID is created by the application. The Series Instance UID is stored in the treatment object. The treatment object is always created in the moment the user presses the “Start treatment” button. Every CALLISTO eye media that has the same Modality (0008,0060) uses same Series Instance UID within a series. “1.2.276.0.75.2.5.90.” is used as constant prefix to generate the UIDs.	ALWAYS	AUTO
Series Number	(0020,0011)	IS	In the scheduled and unscheduled case the Series Number uses technical id of the CALLISTO eye treatment object. The treatment object is always created in the moment the user presses the “Start treatment” button. Every CALLISTO eye media uses same Series Number within a series. Only unique within a study.	ALWAYS	AUTO
Series Date	(0008,0021)	DA	In the scheduled and unscheduled case the Series Date uses creation date of the treatment object. The treatment object is always created in the moment the user presses the “Start treatment” button. Every CALLISTO eye media uses same Series Date within a series.	ALWAYS	AUTO
Series Time	(0008,0031)	TM	In the scheduled and unscheduled case the Series Date uses creation time of the treatment object. The treatment object is always created in the moment the user presses the “Start treatment” button. Every CALLISTO eye media uses same Series Time within a series.	ALWAYS	AUTO
Performing Physician's Name	(0008,1050)	PN	Active user logged in at the moment the user presses the “Stop treatment” button.	ALWAYS	USER / CONFIG

			The field can be configured on User Management Tab in User Settings (CONFIG) and the user has to log in with that user (USER).		
Request Attributes Sequence	(0040,0275)	SQ	In the scheduled case copied from MWL. If either the attribute Requested Procedure ID or Scheduled Procedure Step ID is empty Request Attributes Sequence and all its attributes would not be set. In the unscheduled case attribute is not present.	ANAP	MWL
> Requested Procedure ID	(0040,1001)	SH	In the scheduled case copied from Requested Procedure ID in Modality Worklist. If the attribute Requested Procedure ID is empty Request Attributes Sequence and all its attributes would not be set. In the unscheduled case attribute is not present.	ANAP	MWL
> Requested Procedure Description	(0032,1060)	LO	In the scheduled case copied from Requested Procedure Description in Modality Worklist. In the unscheduled case attribute is not present.	ANAP	MWL
> Scheduled Procedure Step ID	(0040,0009)	SH	In the scheduled case copied from Scheduled Procedure Step ID in Modality Worklist. If the attribute Scheduled Procedure Step ID is empty Request Attributes Sequence and all its attributes would not be set. In the unscheduled case attribute is not present.	ANAP	MWL
> Scheduled Procedure Step Description	(0040,0007)	LO	In the scheduled case copied from Scheduled Procedure Step Description in Modality Worklist. In the unscheduled case attribute is not present.	ANAP	MWL
> Scheduled Protocol Code Sequence	(0040,0008)	SQ	In the scheduled case copied from Scheduled Protocol Code Sequence in Modality Worklist. In the unscheduled case attribute is not present.	ANAP	MWL
>> Include 'Code Sequence Macro'.			In the scheduled case copied from Modality Worklist. In the unscheduled case whole sequence (0040,0008) is not present.	ALWAYS	MWL
Performed Procedure Step ID	(0040,0253)	SH	Note: One CALLISTO eye treatment is one Performed Procedure Step. All media in these treatment share this Performed Procedure Step. The first 16 characters of the CALLISTO eye treatment UUID were used as performed procedure step id.	ALWAYS	AUTO
Performed Procedure Step Start Date	(0040,0244)	DA	Note: This is the start date of the CALLISTO eye treatment.	ALWAYS	AUTO
Performed Procedure Step Start Time	(0040,0245)	TM	Note: This is the start time of the CALLISTO eye treatment.	ALWAYS	AUTO

Performed Procedure Step Description	(0040,0254)	LO	Note: Description containing the text “CALLISTO eye treatment” and the UUID of the CALLISTO eye treatment.	ALWAYS	AUTO

Table 8-4 Common Modules - Module "General Equipment"

Attribute Name	Tag	VR	Value	PoV	Source
Manufacturer	(0008,0070)	LO	In the scheduled and unscheduled case always set to “Carl Zeiss Meditec”.	ALWAYS	AUTO
Institution Name	(0008,0080)	LO	In the scheduled and unscheduled case always set to value from field Institution Name (settings.institutionName). The field can be configured on the DICOM networking tab in the application’s Control Center.	ANAP	CONFIG
Institution Address	(0008,0081)	ST	Address of institution as string. Used together with Institution name (0008,0080) and Institutional Department Name (0008,1040) to fill the address field in CallistoSurgeryReportRawData. May contain: address line 1 address line 2 phone number email web address The fields can be configured on the Institution tab in the application’s Control Center.	ANAP	CONFIG
Station Name	(0008,1010)	SH	In the scheduled and unscheduled case always set to the value of the field Station Name (settings.stationName). The field can be configured on the DICOM networking tab in the application’s Control Center. If the field Station Name is not present, the value is copied from the field AE Title (settings.aetTitle).	ALWAYS	CONFIG
Institutional Department Name	(0008,1040)	LO	The field can be configured on the Institution tab in the application’s Control Center.	ANAP	CONFIG
Manufacturer's Model Name	(0008,1090)	LO	Manufacturer’s model name of the equipment that produced the composite instances. In the scheduled and unscheduled case always set to marketing model name “CALLISTO eye”.	ALWAYS	AUTO
Device Serial Number	(0018,1000)	LO	Transcript of Serial Number. The field can be configured in the System Overview tab in application’s Service User specific Control Center.	ANAP	AUTO
Software Version(s)	(0018,1020)	LO	In the scheduled and unscheduled case always copied from field software version (including patch and build component). The value of field Software Version is displayed on the tab “General” of the application’s Control Center.	ALWAYS	AUTO

8.1.1.5 Ophthalmic Photography 8 Bit Modules

Table 8-5 Ophthalmic Photography 8 Bit Image IOD - Module "Ophthalmic Photography Series"

Attribute Name	Tag	VR	Value	PoV	Source
Modality	(0008,0060)	CS	Source equipment that produced the Ophthalmic Photography Series. In the scheduled and unscheduled case always set to enumerated value “OP”.	ALWAYS	AUTO

Table 8-6 Ophthalmic Photography 8 Bit Image IOD - Module “Synchronization"

Attribute Name	Tag	VR	Value	PoV	Source
Synchronization Frame of Reference UID	(0020,0200)	UI	In the scheduled and unscheduled case the Synchronization Frame of Reference UID is created by the application. Within an initialized DICOM interface instance (reboot of the application or changing DICOM settings) same Synchronization Frame of Reference UID is used. “1.2.276.0.75.2.5.90.” is used as constant prefix to generate the UIDs.	ALWAYS	AUTO
Synchronization Trigger	(0018,106A)	CS	In the scheduled and unscheduled case always set enumerated value “NO TRIGGER”.	ALWAYS	AUTO
Acquisition Time Synchronized	(0018,1800)	CS	In the scheduled and unscheduled case always set to enumerated value “N”.	ALWAYS	AUTO

Table 8-7 Ophthalmic Photography 8 Bit Image IOD - Module “General Image"

Attribute Name	Tag	VR	Value	PoV	Source
Patient Orientation	(0020,0020)	CS	In the scheduled and unscheduled case always empty.	EMTPY	AUTO
Acquisition Number	(0020,0012)	IS	A number identifying the single continuous gathering of data over a period of time that resulted in this image.	ALWAYS	AUTO
Acquisition Date	(0008,0022)	DA	In the scheduled and unscheduled case always set to creation date of the media file (media.startDate).	ALWAYS	AUTO
Acquisition Time	(0008,0032)	TM	In the scheduled and unscheduled case always set to creation time of the media file (media.startTime).	ALWAYS	AUTO
Referenced Instance Sequence	(0008,114A)	SQ	CallistoSurgeryReportRawData Instances significantly related to this Instance. One or more Items are permitted in this Sequence. Note: All Ophthalmic Photography 8 Bit Image objects references the CallistoSurgeryReportRawData.	ANAP	AUTO
> Referenced SOP Class UID	(0008,1150)	UI	Uniquely identifies the referenced SOP Class: 1.2.840.10008.5.1.4.1.1.66	ALWAYS	SRC
> Referenced SOP Instance UID	(0008,1155)	UI	Uniquely identifies the referenced SOP Instance: (0008,0018) SOP Instance UID of the CallistoSurgeryReportRawData	ALWAYS	SRC
> Purpose of Reference Code Sequence	(0040,A170)	SQ	Describes the purpose for which the reference is made.	ALWAYS	AUTO

			Only a single Item shall be included in this Sequence.		
>> Include 'Code Sequence Macro'.			The identifier of the Coded Entry. Shall be present if the code value length is 16 characters or less, and the code value is not a URN or URL. Always: (“122177”, “DCM”, ” Procedure Result”) (Used to reference the CallistoSurgeryReportRawData)	ALWAYS	AUTO

Table 8-8 Ophthalmic Photography 8 Bit Image IOD - Module “Image Pixel"

Attribute Name	Tag	VR	Value	PoV	Source
Rows	(0028,0010)	US	In the scheduled and unscheduled case always set to the number of rows of the media file (always 720).	ALWAYS	AUTO
Columns	(0028,0011)	US	In the scheduled and unscheduled case always set to the number of columns of the media file (always 1280).	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	In the scheduled and unscheduled case always set to “8”.	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	In the scheduled and unscheduled case always set to “8”.	ALWAYS	AUTO
High Bit	(0028,0102)	US	In the scheduled and unscheduled case always set to “7”.	ALWAYS	AUTO
Pixel Data	(7FE0,0010)	OW|OB	A data stream of the pixel samples that comprise the Image.	ALWAYS	ACQUISITION

Table 8-9 Ophthalmic Photography 8 Bit Image IOD - Module “Cine"

Attribute Name	Tag	VR	Value	PoV	Source
Frame Time	(0018,1063)	DS	Nominal time (in msec) per individual frame. See C.7.6.5.1.1 for further explanation. Required if Frame Increment Pointer (0028,0009) points to Frame Time.	ALWAYS	AUTO
Cine Rate	(0018,0040)	IS	Number of frames per second. This attribute is only present in video	ALWAYS	AUTO

Table 8-10 Ophthalmic Photography 8 Bit Image IOD - Module “Multi Frame"

Attribute Name	Tag	VR	Value	PoV	Source
Number of Frames	(0028,0008)	IS	In the scheduled and unscheduled case always set to • images: “1” videos: number of frames of the video	ALWAYS	AUTO
Frame Increment Pointer	(0028,0009)	AT	In the scheduled and unscheduled case always set to “(0018,1063)”.	ALWAYS	AUTO

Table 8-11 Ophthalmic Photography 8 Bit Image IOD - Module “Ophthalmic Photography Image"

Attribute Name	Tag	VR	Value	PoV	Source
Image Type	(0008,0008)	CS	In the scheduled and unscheduled case always set to the multi values “ORIGINAL” and “PRIMARY”.	ALWAYS	AUTO
Instance Number	(0020,0013)	IS	A number that identifies this image.	ALWAYS	AUTO
Samples per Pixel	(0028,0002)	US	In the scheduled and unscheduled case always set to “3”.	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	In the scheduled and unscheduled case always set to enumerated value “YBR_PARTIAL_420” for video and “YBR_FULL_422” for image.	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	In the scheduled and unscheduled case always set to enumerated value “0”.	ALWAYS	AUTO
Planar Configuration	(0028,0006)	US	In the scheduled and unscheduled case always set to enumerated value “0”.	ALWAYS	AUTO
Pixel Spacing	(0028,0030)	DS	Physical distance in the patient between the center of each pixel, specified by a numeric pair - adjacent row spacing (delimiter) adjacent column spacing in mm. Required if Volumetric Properties (0008,9206) is other than DISTORTED or SAMPLED. May be present otherwise. Set to amount of mm per pixel in x direction and y direction. Only present if OP image is referenced by an OPT image. Eg. (0.00283203125/0.01171875)	ANAP	AUTO
Content Time	(0008,0033)	TM	In the scheduled and unscheduled case always set to the creation time of the media file (media.startTime).	ALWAYS	AUTO
Content Date	(0008,0023)	DA	In the scheduled and unscheduled case always set to the creation date of the media file (media.startTime).	ALWAYS	AUTO
Acquisition Datetime	(0008,002A)	DT	In the scheduled and unscheduled case always set to Acquisition Date (0008,0022) and Acquisition Time (0008,0032).	ALWAYS	AUTO
Lossy Image Compression	(0028,2110)	CS	In the scheduled and unscheduled case always set to enumerated value “01”.	ALWAYS	AUTO
Lossy Image Compression Ratio	(0028,2112)	DS	In the scheduled and unscheduled case always set to the lossy image compression ratio of the media file (media.lossyImageCompressionRatio).	ALWAYS	AUTO
Lossy Image Compression Method	(0028,2114)	CS	In the scheduled and unscheduled case always set to • image: ISO_10918_1 • video: ISO_14496_10	ALWAYS	AUTO
Burned In Annotation	(0028,0301)	CS	In the scheduled and unscheduled case always set to enumerated value “NO”.	ALWAYS	AUTO

Table 8-12 Ophthalmic Photography 8 Bit Image IOD - Module “Ocular Region Imaged"

Attribute Name	Tag	VR	Value	PoV	Source
Image Laterality	(0020,0062)	CS	In the scheduled and unscheduled set with the laterality entered by the user via CALLISTO eye GUI when the treatment is started (treatment.laterality). The Image Laterality is stored in the treatment object. Every	ALWAYS	AUTO

			CALLISTO eye media uses same laterality within the entire study.		
Anatomic Region Sequence	(0008,2218)	SQ	Sequence that identifies the anatomic region of interest in this Instance (i.e. external anatomy, surface anatomy, or general region of the body). Only a single Item shall be included in this sequence.	ALWAYS	AUTO
> Include 'Code Sequence Macro'.			In the scheduled and unscheduled case always set to ("T-AA000", “SRT”, “Eye”).	ALWAYS	AUTO

Table 8-13 Ophthalmic Photography 8 Bit Image IOD - Module “Ophthalmic Photography Acquisition Parameters"

Attribute Name	Tag	VR	Value	PoV	Source
Patient Eye Movement Commanded	(0022,0005)	CS	Always empty.	EMPTY	AUTO

Table 8-14 Ophthalmic Photography 8 Bit Image IOD - Module “Ophthalmic Photographic Parameters"

Attribute Name	Tag	VR	Value	PoV	Source
Acquisition Device Type Code Sequence	(0022,0015)	SQ	Describes the type of acquisition device. A single item shall be included in this sequence.	ALWAYS	AUTO
> Include 'Code Sequence Macro'.			In the scheduled and unscheduled case always set to ("R-1021B”, “SRT”, “External Camera”).	ALWAYS	AUTO
Detector Type	(0018,7004)	CS	In the scheduled and unscheduled case always set to enumerated value “CCD”.	ALWAYS	AUTO

Table 8-15 Ophthalmic Photography 8 Bit Image IOD - Module “SOP Common"

Attribute Name	Tag	VR	Value	PoV	Source
SOP Class UID	(0008,0016)	UI	In the scheduled and unscheduled case always set to "1.2.840.10008.5.1.4.1.1.77.1.5.1“	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	In the scheduled and unscheduled case always created by the application. The SOP Instance UID is stored in the CALLISTO eye media object before exporting the media to ensure that one media is exported always with the same SOP Instance UID. The SOP Instance UID is unique for this particular media object. “1.2.276.0.75.2.5.90.” is used as constant prefix to generate the UIDs.	ALWAYS	AUTO
Instance Creation Date	(0008,0012)	DA	In the scheduled and unscheduled case always set to the date the export is done.	ALWAYS	AUTO
Instance Creation Time	(0008,0013)	TM	In the scheduled and unscheduled case always set to the time the export is done.	ALWAYS	AUTO

8.1.1.6 Surgery Report (CallistoSurgeryReportRawData) - RAW Data IOD Modules

Table 8-16 RAW Data IOD - Module "General Series"

Attribute Name	Tag	VR	Value	PoV	Source
Modality	(0008,0060)	CS	Set to “DOC”	ALWAYS	AUTO
Laterality	(0020,0060)	CS	Laterality of the study. Selected by the user and stored in the treatment object in the moment the user presses the “Start treatment” button.	ALWAYS	USER

Table 8-17 RAW Data IOD - Module "Acquisition Context"

Attribute Name	Tag	VR	Value	PoV	Source
Acquisition Context Sequence	(0040,0555)	SQ		EMPTY	AUTO

Table 8-18 RAW Data IOD - Module "Raw Data"

Attribute Name	Tag	VR	Value	PoV	Source
Instance Number	(0020,0013)	IS	A number that identifies this raw data. The value shall be unique within a series.	ALWAYS	AUTO
Content Date	(0008,0023)	DA	In the scheduled and unscheduled case always set to the creation date of the internal surgery report data.	ALWAYS	SRC
Content Time	(0008,0033)	TM	In the scheduled and unscheduled case always set to the creation time of the internal surgery report data.	ALWAYS	SRC
Creator-Version UID	(0008,9123)	UI	Unique identification of the equipment and version of the software that has created the Raw Data information. The UID allows one to avoid attempting to interpret raw data with an unknown format.	ALWAYS	AUTO
Referenced Instance Sequence	(0008,114A)	SQ	FCW Scheduling Object (Planning) Instances significantly related to this Instance. One or more Items are permitted in this Sequence. Note: Only CallistoSurgeryReportRawData references the FCW Scheduling Object.	ANAP	AUTO
> Referenced SOP Class UID	(0008,1150)	UI	Uniquely identifies the referenced SOP Class: 1.2.840.10008.5.1.4.1.1.66	ALWAYS	SRC
> Referenced SOP Instance UID	(0008,1155)	UI	Uniquely identifies the referenced SOP Instance. (0008,0018) SOP Instance UID of the FCW Scheduling Object	ALWAYS	SRC
> Purpose of Reference Code Sequence	(0040,A170)	SQ	Describes the purpose for which the reference is made. Only a single Item shall be included in this Sequence.	ALWAYS	AUTO
>> Include 'Code Sequence Macro'.			Always (“112367”, “DCM”, “Planning Information for Intraoperative Usage”) (Used to reference the FCW Scheduling Object)	ALWAYS	AUTO

Table 8-19 RAW Data IOD - Module "SOP Common"

Attribute Name	Tag	VR	Value	PoV	Source
SOP Class UID	(0008,0016)	UI	Set to: “1.2.840.10008.5.1.4.1.1.66”	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	In the scheduled and unscheduled case always created by the application. The SOP Instance UID is stored in the CALLISTO eye media object before exporting the media to ensure that one media is exported always with the same SOP Instance UID. The SOP Instance UID is unique for this particular media object. “1.2.276.0.75.2.5.90.” is used as constant prefix to generate the UIDs.	ALWAYS	AUTO
Instance Creation Date	(0008,0012)	DA	In the scheduled and unscheduled case always set to the date the export is done.	ALWAYS	AUTO
Instance Creation Time	(0008,0013)	TM	In the scheduled and unscheduled case always set to the time the export is done.	ALWAYS	AUTO

8.1.1.7 Ophthalmic Tomography Image Modules

Table 8-20 Ophthalmic Tomography Image IOD - Module "General Series"

Attribute Name	Tag	VR	Value	PoV	Source
Series Description Code Sequence	(0008,103F)	SQ	A concept that constrains the meaning of (i.e., defines the role of) the Observation Value. The "Name" component of a Name/Value pair. Sequence is set according to capture type	ALWAYS	AUTO
> Include 'Code Sequence Macro'.	3	> Include 'Code Sequence Macro'.	Identifies the coding scheme in which the code for a term is defined. Set to values: (“MACULAR_CUBE”, “99CZM”, “Cube 512x128”) (“RASTER”, “99CZM”, “1-Line Raster Enh.”) (“RASTER”, “99CZM”, “ 5-Line Raster Enh.”)	ALWAYS	AUTO

Table 8-21 Ophthalmic Tomography Image IOD - Module "Ophthalmic Tomography Series"

Attribute Name	Tag	VR	Value	PoV	Source
Modality	(0008,0060)	CS	Source equipment that produced the Ophthalmic Tomography Series. In the scheduled and unscheduled case always set to enumerated value “OPT”.	ALWAYS	AUTO
Series Number	(0020,0011)	IS	In the scheduled and unscheduled case the Series Number uses technical id of the CALLISTO eye treatment object. The treatment object is always created in the moment the user presses the “Start treatment” button.	ALWAYS	AUTO

			Every CALLISTO eye media uses same Series Number within a series. Only unique within a study.		

Table 8-22 Ophthalmic Tomography Image IOD - Module "Frame Of Reference"

Attribute Name	Tag	VR	Value	PoV	Source
Frame of Reference UID	(0020,0052)	UI	Uniquely identifies the frame of reference for a Series. See Section C.7.4.1.1.1 for further explanation.	ALWAYS	AUTO
Position Reference Indicator	(0020,1040)	LO	Set to “Eye”.	ALWAYS	AUTO

Table 8-23 Ophthalmic Tomography Image IOD - Module "Synchronization"

Attribute Name	Tag	VR	Value	PoV	Source
Synchronization Frame of Reference UID	(0020,0200)	UI	New Uid created everytime	ALWAYS	AUTO
Synchronization Trigger	(0018,106A)	CS	Set to “NO TRIGGER”	ALWAYS	AUTO
Acquisition Time Synchronized	(0018,1800)	CS	Set to “”N”	ALWAYS	AUTO

Table 8-24 Ophthalmic Tomography Image IOD - Module "Image Pixel"

Attribute Name	Tag	VR	Value	PoV	Source
Rows	(0028,0010)	US	Number of rows in the image. Set to height of images	ALWAYS	AUTO
Columns	(0028,0011)	US	Number of columns in the image. Set to width of images	ALWAYS	AUTO
Pixel Data	(7FE0,0010)	OW|OB	A data stream of the pixel samples that comprise the Image.	ALWAYS	AUTO

Table 8-25 Ophthalmic Tomography Image IOD - Module "Multi-Frame Functional Groups"

Attribute Name	Tag	VR	Value	PoV	Source
Shared Functional Groups Sequence	(5200,9229)	SQ	Sequence that contains the Functional Group Macros that are shared for all frames in this SOP Instance and Concatenation.	ALWAYS	AUTO
> Pixel Measures Sequence	(0028,9110)	SQ	Identifies the physical characteristics of the pixels of this frame. Only a single Item shall be permitted in this sequence.	ALWAYS	AUTO
>> Pixel Spacing	(0028,0030)	DS	Physical distance in the patient between the center of each pixel, specified by a numeric pair - adjacent row spacing (delimiter) adjacent column spacing in mm. Required if Volumetric Properties (0008,9206) is other than DISTORTED or SAMPLED. May be present otherwise. Set to amount of mm per pixel in x direction and y direction. Eg. (0.00283203125/0.01171875)	ALWAYS	AUTO
>> Slice Thickness	(0018,0050)	DS	Nominal reconstructed slice thickness, in mm. See C.7.6.2.1.1 and C.7.6.16.2.3.1 for further explanation.	ALWAYS	AUTO

			Required if Volumetric Properties (0008,9206) is VOLUME or SAMPLED. May be present otherwise. Set to “0.00002”		
> Referenced Image Sequence	(0008,1140)	SQ	Reference to the referenced OP image	ALWAYS	AUTO
>> Referenced SOP Class UID	(0008,1150)	UI	Uniquely identifies the referenced SOP Class. Set to “1.2.840.10008.5.1.4.1.1.77.1.5.1”	ALWAYS	AUTO
>> Referenced SOP Instance UID	(0008,1155)	UI	Uniquely identifies the referenced SOP Instance. Set to the SOP instance UID of the referenced OP image	ALWAYS	AUTO
>> Purpose of Reference Code Sequence	(0040,A170)	SQ	Specifies that the purpose is for a localizer	ALWAYS	AUTO
>>> Include 'Code Sequence Macro'.			Set to (“121311”, “DCM”, “20120401”, “Localizer”	ALWAYS	AUTO
> Frame Anatomy Sequence	(0020,9071)	SQ		ALWAYS	AUTO
>> Frame Laterality	(0020,9072)	CS	Laterality of object imaged. “R” or “L”	ALWAYS	AUTO
>> Anatomic Region Sequence	(0008,2218)	SQ	Sequence that identifies the anatomic region of interest in this Instance	ALWAYS	AUTO
>>> Include 'Code Sequence Macro'.			Identifier that is unambiguous within the Coding Scheme denoted by Coding Scheme Designator. Set to (“T-AA000”, “SRT”, “Eye”) which is code for Eye Coding Scheme Designator set to “SRT” for SNOMED-RT	ALWAYS	AUTO
Per-frame Functional Groups Sequence	(5200,9230)	SQ	Sequence that contains the Functional Group Sequence Attributes corresponding to each frame of the Multi-frame Image.	ALWAYS	AUTO
> Frame Content Sequence	(0020,9111)	SQ	Identifies general characteristics of this frame. Only a single Item shall be included in this sequence.	ALWAYS	AUTO
>> Frame Reference Datetime	(0018,9151)	DT	The point in time that is most representative of when data was acquired for this frame. See C.7.6.16.2.2.1 and C.7.6.16.2.2.2 for further explanation. Note: The synchronization of this time with an external clock is specified in the synchronization Module in Acquisition Time synchronized (0018,1800). Required if Frame Type (0008,9007) Value 1 of this frame is ORIGINAL. May be present otherwise. Capture start + (index of frame * duration of FrameAcquisitionDatetime)	ALWAYS	AUTO
>> Frame Acquisition Datetime	(0018,9074)	DT	The date and time that the acquisition of data that resulted in this frame started. See C.7.6.16.2.2.1 for further explanation. Required if Frame Type (0008,9007) Value 1 of this frame is ORIGINAL. May be present otherwise. Capture start + (index of frame * duration of FrameAcquisitionDatetime)	ALWAYS	AUTO

>> Frame Acquisition Duration	(0018,9220)	FD	The actual amount of time [in milliseconds] that was used to acquire data for this frame. See C.7.6.16.2.2.1 and C.7.6.16.2.2.3 for further explanation. Required if Frame Type (0008,9007) Value 1 of this frame is ORIGINAL. May be present otherwise. Duration of caputure / total amount of images	ALWAYS	AUTO
>> Dimension Index Values	(0020,9157)	UL	Contains the values of the indices defined in the Dimension Index Sequence for this multi-frame header frame. Set to “StackId/ InStackPositionNumber”, eg. “1/1”, “1/2”… “1/128”	ALWAYS	AUTO
>> Stack ID	(0020,9056)	SH	Identification of a group of frames, with different positions and/or orientations that belong together, within a dimension organization. Always set to “1” as only one stack is transmitted.	ALWAYS	AUTO
>> In-Stack Position Number	(0020,9057)	UL	The ordinal number of a frame in a group of frames, with the same Stack ID. From 1 to n, where n is NumberOfFrames	ALWAYS	AUTO
> Ophthalmic Frame Location Sequence	(0022,0031)	SQ	Specifies the column locations for this frame in terms of locations on a referenced image.	ALWAYS	AUTO
>> Referenced SOP Class UID	(0008,1150)	UI	Set to “1.2.840.10008.5.1.4.1.1.77.1.5.1”	ALWAYS	AUTO
>> Referenced SOP Instance UID	(0008,1155)	UI	Set to the SOP instance UID of the referenced OP image	ALWAYS	AUTO
>> Reference Coordinates	(0022,0032)	FL	Set to the coordinates of the localizer line in the reference image for the specified frame number.	ALWAYS	AUTO
>> Ophthalmic Image Orientation	(0022,0039)	CS	Set to “LINEAR”.	ALWAYS	AUTO
Instance Number	(0020,0013)	IS	A number that identifies this instance. The value shall be the same for all SOP Instances of a Concatenation, and different for each separate Concatenation and for each SOP Instance not within a Concatenation in a series.	ALWAYS	AUTO
Content Date	(0008,0023)	DA	The time the data creation was started. Time of creation of media	ALWAYS	AUTO
Content Time	(0008,0033)	TM	The date the data creation was started. Date of creation of media	ALWAYS	AUTO
Number of Frames	(0028,0008)	IS	Set to number of images in capture. (eg. 1 for 1 line scan, 5 for 5 line scan or 128 for cube).	ALWAYS	AUTO
Representative Frame Number	(0028,6010)	US	Set to NumberOfImages/2	ALWAYS	AUTO
Concatenation UID	(0020,9161)	UI	Identifier of all SOP Instances that belong to the same concatenation. Required if a group of multi-frame image SOP Instances within a Series are part of a Concatenation.	ALWAYS	AUTO

Table 8-26 Ophthalmic Tomography Image IOD - Module "Multi-Frame Dimension"

Attribute Name	Tag	VR	Value	PoV	Source
Dimension Organization Sequence	(0020,9221)	SQ	Used to set the order to StackId/ InStackPositionNumber	ALWAYS	AUTO
> Dimension Organization UID	(0020,9164)	UI	Uniquely identifies a set of dimensions referenced within the containing SOP Instance.	ALWAYS	AUTO
Dimension Index Sequence	(0020,9222)	SQ	Contains two items which specify the order StackId/InStackPositionNumber	ALWAYS	AUTO
> Dimension Index Pointer	(0020,9165)	AT	First item set to “00209056“ (StackId) Second item set to “00209057“ (InStackPosition)	ALWAYS	AUTO
> Functional Group Pointer	(0020,9167)	AT	Both items set to “00209111“ (FrameContentSequence)	ALWAYS	AUTO

Table 8-27 Ophthalmic Tomography Image IOD - Module "Acquisition Context"

Attribute Name	Tag	VR	Value	PoV	Source
Acquisition Context Sequence	(0040,0555)	SQ	A sequence of items that describes the conditions present during the acquisition of the data of the SOP Instance. Zero or more items shall be included in this sequence.	ALWAYS	AUTO
> Value Type	(0040,A040)	CS	Set to “NUMERIC”	ALWAYS	AUTO
> Concept Name Code Sequence	(0040,A043)	SQ	Used to store the image presentation aspect ratio (to which aspect ratio the image should be resized)	ALWAYS	AUTO
>> Include 'Code Sequence Macro'.			Set to (“IPAR”, “99CZM”, “Image Presentation aspect ratio width and height”)	ALWAYS	AUTO
> Numeric Value	(0040,A30A)	DS	Set to “scan width in mm”/”scan depth in mm” eg. “6/2.9”	ALWAYS	AUTO
> Measurement Units Code Sequence	(0040,08EA)	SQ	Units of measurement. Required if a sequence item is present and Numeric Value is sent.	ALWAYS	AUTO
>> Include 'Code Sequence Macro'.			Set to (“{ratio}”, “UCUM”, “20120401”, “ratio”)	ALWAYS	AUTO

Table 8-28 Ophthalmic Tomography Image IOD - Module "Ophthalmic Tomography Image"

Attribute Name	Tag	VR	Value	PoV	Source
Image Type	(0008,0008)	CS	Set to “ORIGINAL\PRIMARY\\CUBE512X128” or “ORIGINAL\PRIMARY\\HD5LINE” or “ORIGINAL\PRIMARY\\HD1LINE” depending on scan type.	ALWAYS	AUTO
Samples per Pixel	(0028,0002)	US	Set to “1”	ALWAYS	AUTO
Acquisition Datetime	(0008,002A)	DT	The date and time that the acquisition of data started. DateTime of media creation	ALWAYS	AUTO
Acquisition Duration	(0018,9073)	FD	The scan time in seconds used to create all frames of an Ophthalmic Tomography image. Required if Image Type (0008,0008) Value 1 is ORIGINAL.	ALWAYS	AUTO

Acquisition Number	(0020,0012)	IS	A number identifying the single continuous gathering of data over a period of time which resulted in this image.	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	Set to “MONOCHROME2”	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	Set to “0”	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	Set to “8”	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	Set to “8”	ALWAYS	AUTO
High Bit	(0028,0102)	US	Set to “7”	ALWAYS	AUTO
Presentation LUT Shape	(2050,0020)	CS	Set to “IDENTITY”	ALWAYS	AUTO
Lossy Image Compression	(0028,2110)	CS	Set to “00” (No compression)	ALWAYS	AUTO
Burned In Annotation	(0028,0301)	CS	Set to “NO”	ALWAYS	AUTO
Concatenation Frame Offset Number	(0020,9228)	UL	Set to “0”	ALWAYS	AUTO
In-concatenation Number	(0020,9162)	US	Set to “1”	ALWAYS	AUTO
In-concatenation Total Number	(0020,9163)	US	Set to “1”	ALWAYS	AUTO

Table 8-29 Ophthalmic Tomography Image IOD - Module "Ophthalmic Tomography Acquisition Parameters"

Attribute Name	Tag	VR	Value	PoV	Source
Axial Length of the Eye	(0022,0030)	FL	Axial length of the eye in mm.	AUTO	EMPTY
Horizontal Field of View	(0022,000C)	FL	The horizontal field of view in degrees	AUTO	EMPTY
Refractive State Sequence	(0022,001B)	SQ	The refractive state of the imaged eye at the time of acquisition. Zero or one Item shall be included in this sequence. Zero length means the refractive state was not measured.	AUTO	EMPTY
Emmetropic Magnification	(0022,000A)	FL	Emmetropic magnification value (dimensionless). Zero length means the emmetropic magnification was not measured.	AUTO	EMPTY
Intra Ocular Pressure	(0022,000B)	FL	Value of intraocular pressure in mmHg. Zero length means the pressure was not measured	AUTO	EMPTY
Pupil Dilated	(0022,000D)	CS	Whether or not the patient’s pupils were pharmacologically dilated for this acquisition. Enumerated Values: YES NO If this tag is empty, no information is available.	AUTO	EMPTY

Table 8-30 Ophthalmic Tomography Image IOD - Module "Ophthalmic Tomography Parameters"

Attribute Name	Tag	VR	Value	PoV	Source
Acquisition Device Type Code Sequence	(0022,0015)	SQ	Describes the type of acquisition device.	ALWAYS	AUTO
> Include 'Code Sequence Macro'.			Code value = “A-00FBE”, which is the code for OCT scanner Coding Scheme Designator = “SRT” for SNOMED-RT Set to (“A-00FBE”, “SRT”, “Optical Coherence Tomography Scanner”)	ALWAYS	AUTO
Light Path Filter Type Stack Code Sequence	(0022,0017)	SQ	Filters used in the light source path. Zero or more items shall be included in this sequence.	ALWAYS	AUTO
> Include 'Code Sequence Macro'.			Code value = “A-010DC”r Coding Scheme Designator = “SRT” for SNOMED-RT Set to (“A-010DC”, “SRT”, “Infrared optical filter”)	ALWAYS	AUTO
Detector Type	(0018,7004)	CS	Set to “CCD”	ALWAYS	AUTO

Table 8-31 Ophthalmic Tomography Image IOD - Module "Ocular Region Imaged"

Attribute Name	Tag	VR	Value	PoV	Source
Image Laterality	(0020,0062)	CS	Laterality of object imaged. “R” or “L”	ALWAYS	AUTO
Anatomic Region Sequence	(0008,2218)	SQ	Sequence that identifies the anatomic region of interest in this Instance	ALWAYS	AUTO
> Include 'Code Sequence Macro'.			Code value = “A- AA000” which is code for Eye Coding Scheme Designator = “SRT” for SNOMED-RT Set to (“A- AA000”, “SRT”, “Eye”)	ALWAYS	AUTO

Table 8-32 Ophthalmic Tomography Image IOD - Module "SOP Common"

Attribute Name	Tag	VR	Value	PoV	Source
SOP Class UID	(0008,0016)	UI	Set to “1.2.840.10008.5.1.4.1.1.77.1.5.4” => Ophthalmic Tomography Image IOD	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	In the scheduled and unscheduled case always created by the application. The SOP Instance UID is stored in the CALLISTO eye media object before exporting the media to ensure that one media is exported always with the same SOP Instance UID. The SOP Instance UID is unique for this particular media object. “1.2.276.0.75.2.5.90.” is used as constant prefix to generate the UIDs.	ALWAYS	AUTO
Specific Character Set	(0008,0005)	CS	Filled by NIM as required. (Usually “ISO_IR 192”, allowing UTF-8-Strings)	ALWAYS	AUTO

Instance Creation Date	(0008,0012)	DA	Date the SOP Instance was created. Set to date of object creation.	ALWAYS	AUTO
Instance Creation Time	(0008,0013)	TM	Time the SOP Instance was created. Set to time of object creation.	ALWAYS	AUTO

8.1.2 Usage of Attributes from Received IOD's

The usage of attributes of Modality Worklist IODs is described in chapter 4.2.1.3.2 Activity – Query Modality Worklist.

8.1.3 Attribute Mapping

In the scheduled case, the following attributes are mapped from Modality Worklist to instances of Ophthalmic Photography 8 Bit Image IOD.

Table 8-33 Attribute Mapping from MWL to Storage IOD

Modality Worklist	Instance IOD	Editable
Study Instance UID	Study Instance UID	No
Referenced Study Sequence	Referenced Study Sequence	No
Accession Number	Accession Number	No
Requested Procedure ID	Request Attributes Sequence > Requested Procedure ID	No
	Study ID	No
Requested Procedure Description	Request Attributes Sequence > Requested Procedure Description	No
	Study Description	No
Requested Procedure Code Sequence	Procedure Code Sequence	No
Scheduled Procedure Step Sequence > Scheduled Procedure Step ID	Request Attributes Sequence > Scheduled Procedure Step ID	No
Scheduled Procedure Step Sequence > Scheduled Procedure Step Description	Request Attributes Sequence > Scheduled Procedure Step Description	No
Scheduled Procedure Step Sequence > Schedule Protocol Code Sequence	Request Attributes Sequence > Scheduled Protocol Code Sequence	No
Referring Physician's Name	Referring Physician's Name	No
Issuer of Patient ID	Issuer of Patient ID	No
Other Patient IDs	Other Patient IDs	No
Patient's Name	Patient's Name	No
Patient ID	Patient ID	No
Patients Birth Date	Patients Birth Date	No
Patients Sex	Patients Sex	No
Patient Comments	Patient Comments	No
Ethnic Group	Ethnic Group	No

8.1.4 Coerced/Modified Files

Those tags are listed in chapter 4.2.1.3.2 Activity – Query Modality Worklist. Other attributes get lost and are not available in the CALLISTO eye Application Software.

8.2 Data Dictionary of Private Attributes

CALLISTO eye reserves a block of private attributes in group 2201.

Table 8-34 Private Dictionary Group (2201,00xx) = "99CZM_NIM_INTERNAL_01"

Occurs in: ALL IODs

Tag	Attribute Name	VR	VM
(2201,00xx)	Private Creator	LO	1
(2201,xx00)	Iod_name_meta_info	LT	1
(2201,xx01)	Czm_xml_version	LT	1
(2201,xx02)	Private_module_names_and_versions	LT	1

8.3 Coded Terminology and Templates

Not applicable.

8.4 Greyscale Image Consistency

Not applicable.

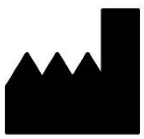
8.5 Standard Extended / Specialized/ Private SOP Classes

Not applicable.

8.6 Private Transfer Syntaxes

No Private Transfer Syntax is supported.

The product is labeled with:



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