CARL ZEISS MEDITEC

DICOM Conformance Statement

CIRRUS™ photo

Instrument Software

Version 2.0

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1 Conformance Statement Overview

The CIRRUS photo is a non-contact, high-resolution tomographic and biomicroscopic imaging device that incorporates a digital camera which is suitable for photographing, displaying and storing the data of the retina and surrounding parts of the eye to be examined under mydriatic and non-mydriatic conditions.

The CIRRUS photo allows the fundus of the eye to be viewed and documented as well as the anterior segment of the eye in plain view (classic image capture) or as an optical section (OCT scan), with the pupil in a naturally or medicinally-induced dilated state. Easy-to-use operation of CIRRUS photo ensures quick results. The device is particularly suitable for routine use. The fundus is evaluated on the basis of a flash photograph or the OCT scan image. Image capture and display is fully digital.

The CIRRUS photo includes an intuitive software interface for database supported patient and image data administration. Images and scans can be displayed, printed and exported and patient data created and adapted with no difficulty at any time. There are special analysis modules which can be used to aid rapid interpretation of OCT scan data. The normative databases and algorithms provided by Carl Zeiss Meditec represent the basis for these modules.

The CIRRUS photo implements one single DICOM Application Entity which allows to:

- query modality worklist
- query for patients and data
- archive images, scan data and analysis data
- archive evidence reports
- retrieve images, scan data and analysis data

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

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
Encapsulated PDF Storage	Yes	No
Raw Data Storage	Yes	Yes
Multi-frame True Color Secondary Capture Image Storage	Yes	Yes
Ophthalmic Photography 8 Bit Image Storage	Yes	Yes
Workflow Management		
Modality Worklist Information Model - FIND	Yes	No
Storage Commitment Push Model	Yes	No
Query / Retrieve		
Study Root Query/Retrieve Information Model – FIND	Yes	No
Study Root Query/Retrieve Information Model – MOVE	Yes	No
Patient Root Query/Retrieve Information Model – FIND	Yes	No
Patient Root Query/Retrieve Information Model – MOVE	Yes	No

The CIRRUS photo does not support Media Interchange.

2 Table of Contents

3 Introduction

3.1 Revision History

Document Version	Author	Date	Changes
1.0	Patrick A. Nast	2013-03-21	Initial document
1.1	Patrick A. Nast	2013-12-16	Product version 1.5.3 - Query Keys for 4.2.1.3.3 Activity - Query remote AE for patients and data changed - DICOM UID root changed - New software version info
2.0	Patrick A. Nast	2015-07-09	Product version 2.0.0 - New activity "Offline media file based export / import of images and reports" - New Implementation Version Name - New Software Version info

3.2 Audience

This document is written for the people that need to understand how CIRRUS photo 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 CIRRUS photo 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
a 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.

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
A 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 3-1 Abbreviations used in this document

Abbreviation	Definition
AE	Application Entity
AET	Application Entity Title
DICOM	Digital Imaging and Communications in Medicine
ILE	Implicit Little Endian
ELE	Explicit Little Endian
IM	Information Model
IOD	Information Object Definition
JPG-1	JPEG Coding Process 1 transfer syntax; JPEG Baseline; ISO 10918-1
J2K	JPEG 2000 Image Compression
J2K-LL	JPEG 2000 Image Compression (Lossless Only)
MWL	Modality Worklist
MPG2	Motion Picture Expert Group 2; Abbreviation and synonym for video encoding and compression transfer syntax.
OD	Oculus Dexter, the right eye
OP	Ophthalmic Photography
OPT	Ophthalmic Tomography
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.

TCP/IP	Transmission Control Protocol / Internet Protocol
UID	Unique Identifier
UI	User Interface

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

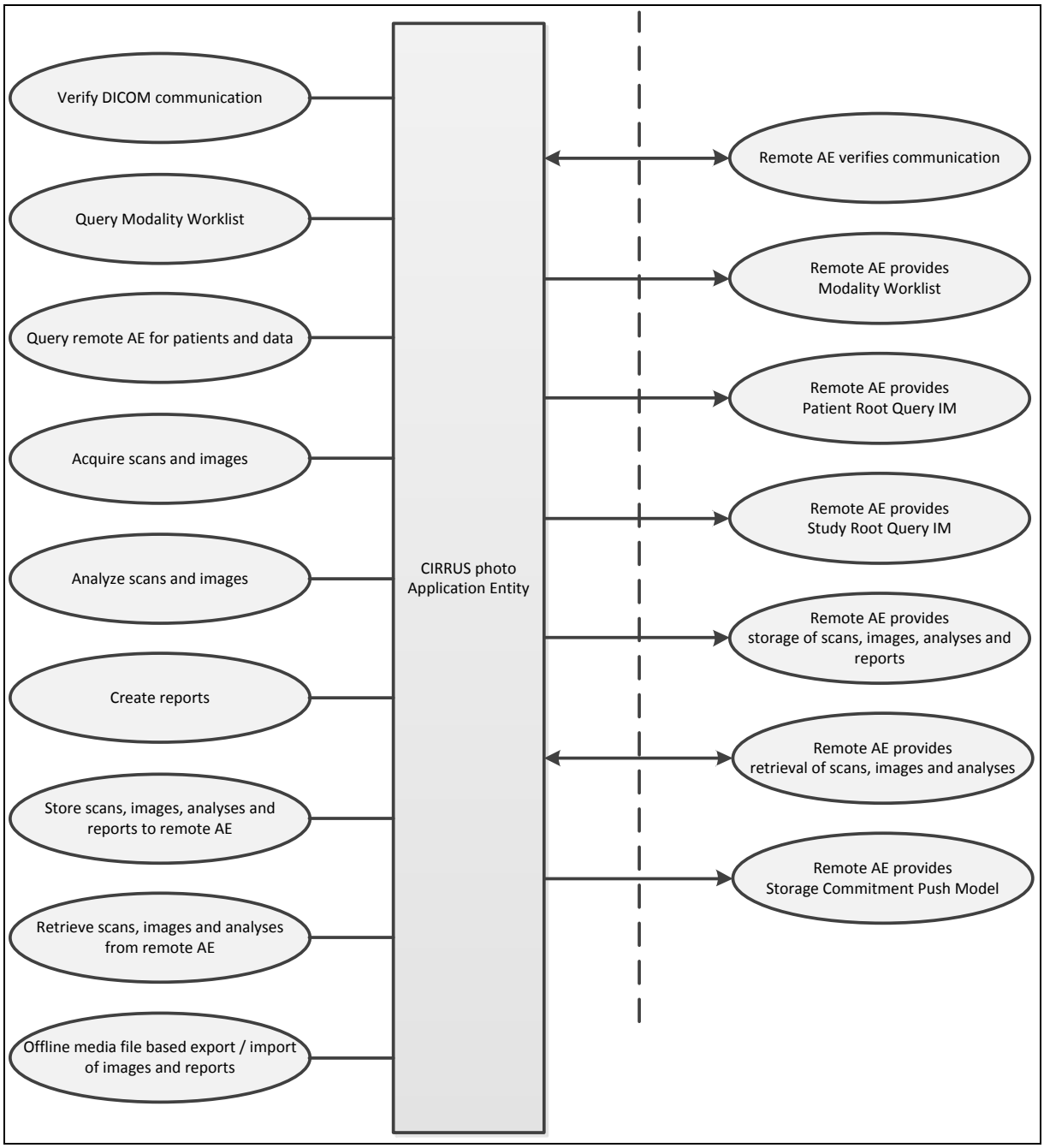


Figure 4-1 CIRRUS photo Application Software as Acquisition Modality

4.1.2 Functional Definition of AEs

4.1.2.1 Functional Definition of CIRRUS photo

The CIRRUS photo is a non-contact, high-resolution tomographic and biomicroscopic imaging device that incorporates a digital camera which is suitable for photographing, displaying and storing the data of the retina and surrounding parts of the eye to be examined under mydriatic and non-mydriatic conditions.

The CIRRUS photo allows the fundus of the eye to be viewed and documented as well as the anterior segment of the eye in plain view (classic image capture) or as an optical section (OCT scan), with the pupil in a naturally or medicinally-induced dilated state. Easy-to-use operation of CIRRUS photo ensures quick results. The device is particularly suitable for routine use. The fundus is evaluated on the basis of a flash photograph or the OCT scan image. Image capture and display is fully digital.

The CIRRUS photo includes an intuitive software interface for database supported patient and image data administration. Images and scans can be displayed, printed and exported and patient data created and adapted with no difficulty at any time. There are special analysis modules which can be used to aid rapid interpretation of OCT scan data. The normative databases and algorithms provided by Carl Zeiss Meditec represent the basis for these modules.

The CIRRUS photo application's DICOM functionality allows to:

- query modality worklist
- query for patients and data
- archive images, scan data and analysis data
- archive evidence reports
- retrieve images, scan data and analysis data
- offline media file based export / import of images and reports

CIRRUS photo AE implements a Service Class User (SCU) for the following DICOM Services:

- Verification
- Modality Worklist Information Model – FIND
- Study Root Query/Retrieve Information Model – FIND
- Study Root Query/Retrieve Information Model – MOVE
- Patient Root Query/Retrieve Information Model – FIND
- Patient Root Query/Retrieve Information Model – MOVE
- Encapsulated PDF Storage
- Raw Data Storage
- Multi-frame True Color Secondary Capture Image Storage
- Ophthalmic Photography 8 Bit Image Storage
- Storage Commitment Push Model

CIRRUS photo AE implements a Service Class Provider (SCP) for the following DICOM Services:

- Verification
- Raw Data Storage
- Multi-frame True Color Secondary Capture Image Storage
- Ophthalmic Photography 8 Bit Image Storage

All DICOM functionalities have been integrated into the application user interface and will not require any manual invoking of DICOM specific user interface.

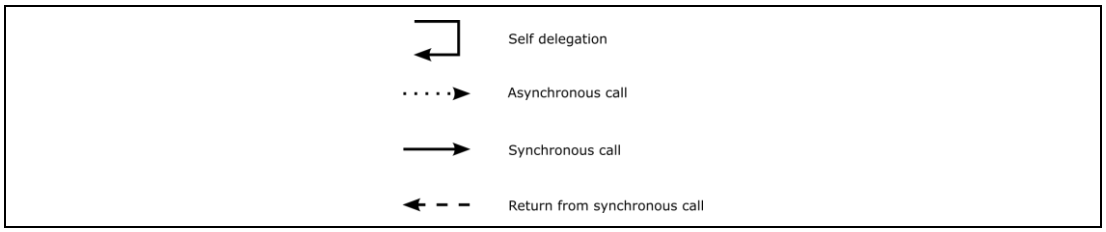
The CIRRUS photo software allows performing a verification of the configured AEs. The result of this verification contains information about the supported SOP Classes and Transfer Syntaxes of the remote AEs.

The CIRRUS photo Software logs extensive information about the DICOM operations to its log file.

In addition to network based DICOM services the CIRRUS photo AE offers an offline DICOM file based media storage service which provides the possibility of writing and reading single DICOM files for selected images and reports to local, removable or network drives.

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 CIRRUS photo activities

Query Modality Worklist

When the patient arrives at the CIRRUS photo, the operator queries the worklist. This can be done by simply opening the "Today's Patients" screen which lists all worklist items scheduled for today's date and the current CIRRUS photo (identified by the instrument's AE Title) or by using the "Search worklist" dialog which allows to enter search criteria to get matching items back from modality worklist.

In either way the operator can select the correct item from the result list to proceed with data acquisition. According to the transferred data CIRRUS photo creates an entry in the local database.

Note: "Today's Patients" screen also lists non-scheduled patients, which already have a performed series for today and match any additionally entered search criteria. These patients are received by querying a remote AE.

Query remote AE for patients and data

With this activity the operator can search patients and data stored at a remote AE. This can be done by opening the "Find Patient" screen and entering search criteria for either patient demographics or stored data specifics. Any matching results will be listed in patient list, visit list and exam list accordingly. Only data supported by CIRRUS photo will be listed.

This activity can be used to get patient demographics in cases when Modality Worklist service provider is not available or can't be reached.

This activity generates an unscheduled case.

The operator can then select the patient for data acquisition or analysis.

Note: Also "Today's Patients" screen lists patients received by querying a remote AE. See 'Query Modality Worklist' for details.

Acquire scans and images

The operator selects a patient from either "Today's Patients" or "Find Patient" screen and switches to "Acquire Data" screen. There he/she can select an appropriate acquisition protocol and performs then the scan/image capture on patient's eye. The Application Software allows the user to review the acquired data before permanently saving.

This activity creates scan data, images and machine generated analysis data. This data is pushed to archive automatically whenever "Acquire Data" screen is left and the user is not in the "Review Image" mode.

Analyze scans and images

The operator can trigger this activity from either "Review Image" or "Analyze" screen by selecting a specific image manipulation or analysis protocol. Applicable analyses depend on the available and selected scan data and images. The user can adjust parameters to optimize the analysis result.

The operator can invoke the creation of an evidence report by using the "Electronic report" feature (see Activity "Create reports") at any time within the analysis activity.

Any analysis data or manipulated image created within the analysis activity is pushed to archive automatically.

Create reports

The operator can invoke the creation of an evidence report by using the "Electronic report" feature at any time within the activity "Analyze scans and images". Thus he or she can export several evidence reports during the analysis activity.

Any evidence reports created within this activity is pushed to archive automatically.

Store scans, images, analyses and reports to remote AE

This activity is a background activity which cannot be triggered manually by the operator but will always be triggered automatically by the application in case of new data has been created by other activities. During this activity acquired data, analysis data and evidence reports are transferred to the configured Storage Provider.

This activity will pause for benefit of high priority activities (e.g. "Acquire scans and images") and resume after such activities has been finished.

After a configurable amount of time, the Application Software asks the configured Storage Commitment Provider to take over responsibility on data persistence for the data previously transferred by the "Archive data" activity. When storage is committed the operator is allowed to enable removal of this data from the modality. This will typically be done in the shutdown routine.

Retrieve scans, images and analyses from remote AE

With this activity the operator can retrieve data from the remote AE. Retrieval can be triggered by selecting an item from either "Today's Patients" or "Find Patient" result list for which data is available at the remote AE. Only data supported by the Application Software will be retrieved, which includes data generated by "CIRRUS photo" Application Software itself and data generated by the Carl Zeiss Meditec VISUCAM family (when available as Ophthalmic Photography IOD).

Evidence reports cannot be retrieved.

Offline media file based export / import of images and reports

With this activity the operator can select a patient, a visit or single images or reports for being stored to the file system at either a local, removable or shared network drive. The AE will store the selected items accordingly as DICOM files. Only fundus images, B-Scan images and reports are subject of DICOM file based export. To trigger this activity the operator can use the "File→File export" or the "Tools→File mass export" dialog.

It's also possible to import existing DICOM files to the AE. After selecting the files the application software reads the content and stores the data accordingly to the local database. Only fundus images, B-Scan images and reports are subject of DICOM file based import. To trigger this activity the operator can use the "File→File import" or the "Tools→File mass import" dialog.

4.1.3.2 Scheduled case

The normal case is that the patient arrives at the front desk. There could be two possibilities at this point:

- The examination can be scheduled for the instrument.
- The examination was scheduled in advance.

In either case all patient and study related information is available at the day the examination takes place This information can then be used to take the examination. The operator can trigger all activities listed below. An activity can be triggered if no other activity is currently active. The shown order of the activities is the recommended order. Details on DIMSE level will be explained in chapters after this.

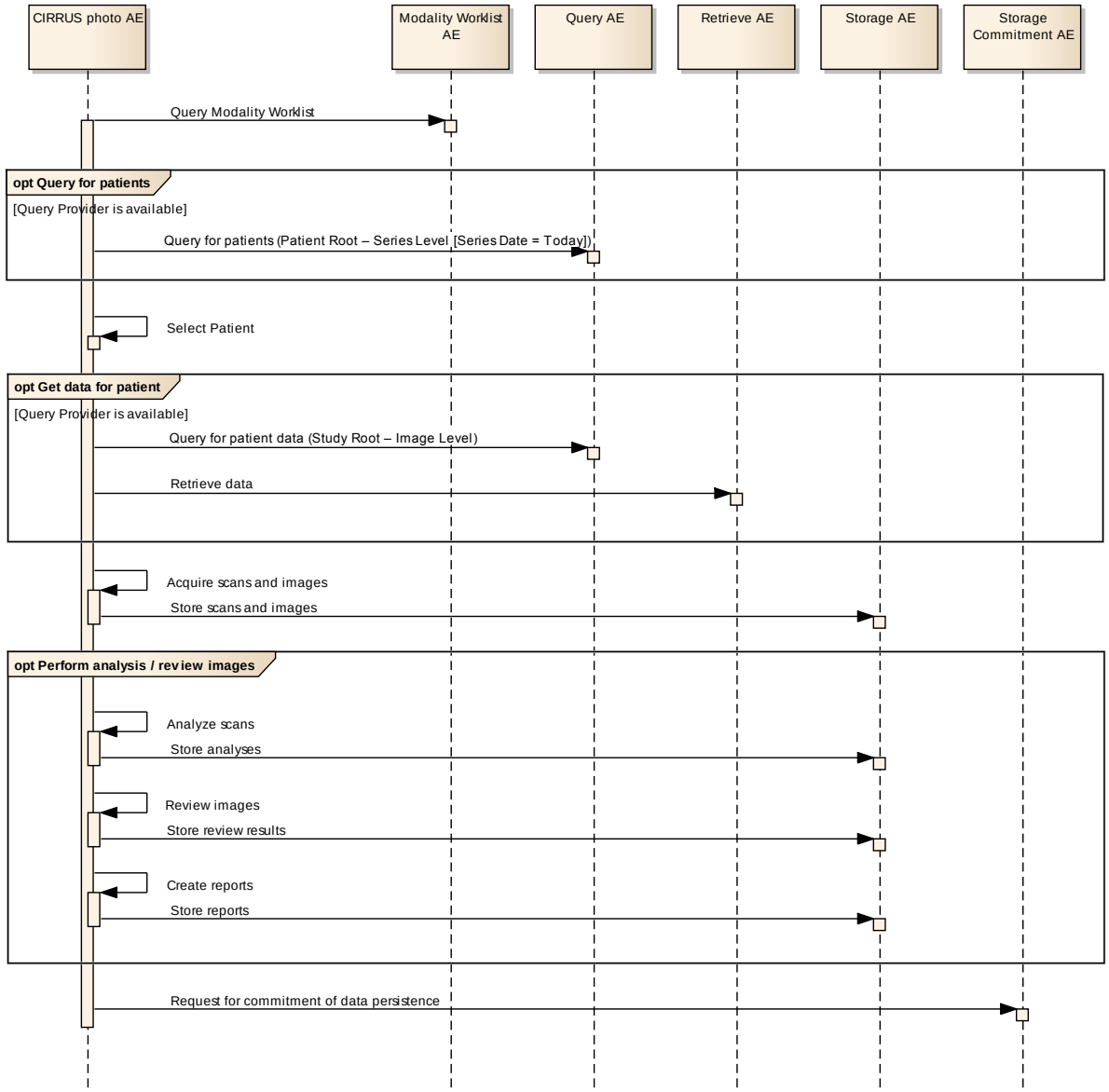


Figure 4-2 Scheduled case

4.1.3.3 Unscheduled case

In the unscheduled case the patient arrives immediately at the instrument, so that the patient was not registered at the front desk and examination is not scheduled in the Modality Worklist. Patient demographics, study information and scheduling information has to be generated at the point of origin or can be queried from the remote Query AE.

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

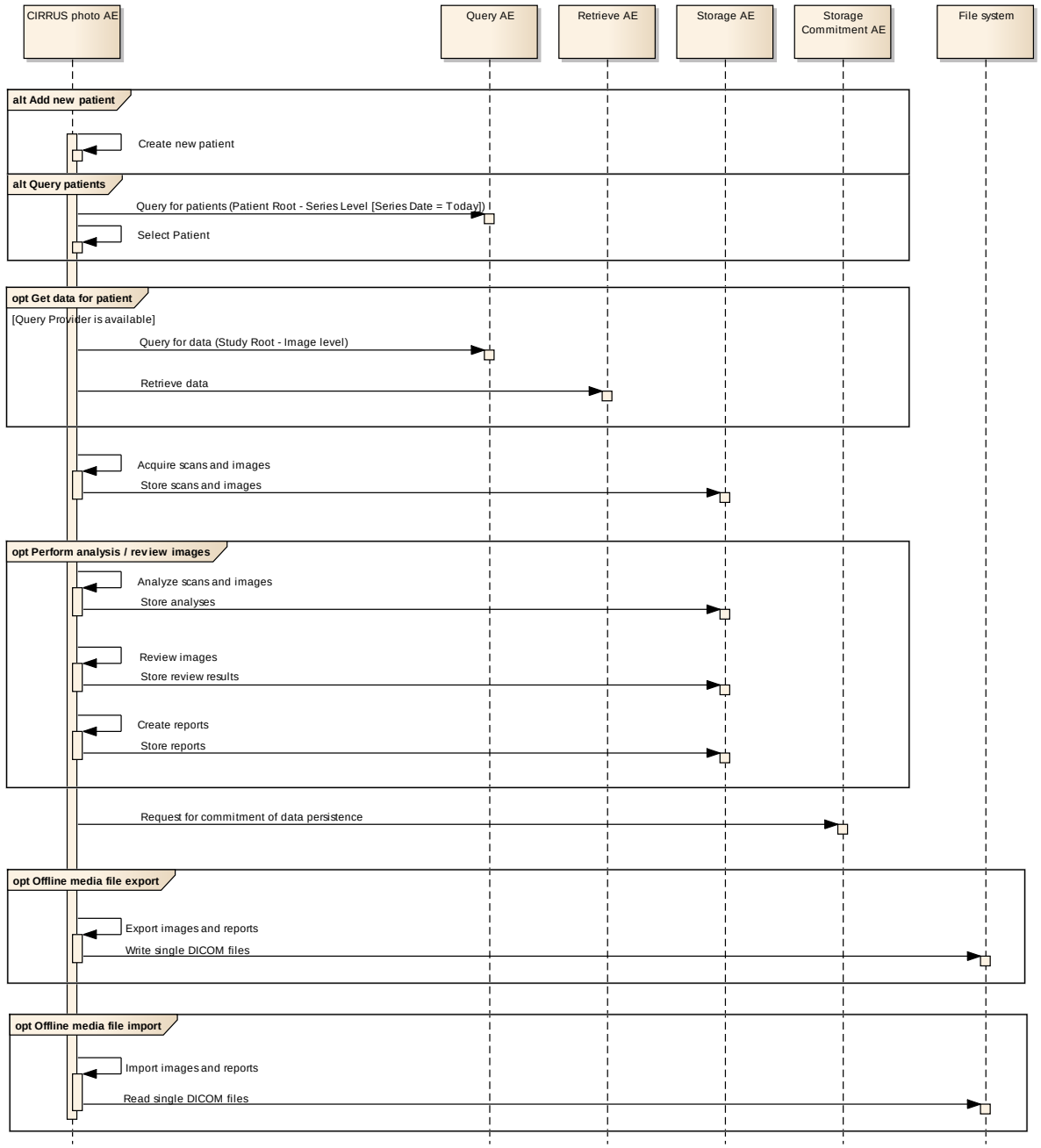


Figure 4-3 Unscheduled case

4.2 AE Specifications

4.2.1 CIRRUS photo Acquisition Modality AE Specification

4.2.1.1 SOP Classes

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	Yes	Yes
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Yes	No
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	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
Patient Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	Yes	No
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Yes	No
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	Yes	Yes
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	Yes

Note 1: The networking interface proposes more presentation contexts than actually supported by the application. All lines in grey are not supported by Cirrus Photo.

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:

Application Context Name	1.2.840.10008.3.1.1.1

4.2.1.2.2 Number of Associations

The number of simultaneous associations depends on the usage profile. At a certain point of time there might be active simultaneously:

- 1 association for Verification
- 1 association for Storage
- 1 association for Storage Commitment
- 1 association for Query/Retrieve - MOVE
- n associations for Modality Worklist - FIND, depending on whether search criteria are changed while a previous query is still active (no response yet)
- n associations for Query/Retrieve - FIND, depending on whether search criteria are changed while a previous query is still active (no response yet)

The maximum number of simultaneous associations is limited:

Maximum number of simultaneous associations	50

4.2.1.2.3 Asynchronous Nature

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

4.2.1.2.4 Implementation Identifying Information

Implementation Class UID	1.2.276.0.75.2.5.20
Implementation Version Name	NIM-2.6.2

4.2.1.3 Association Initiation Policy

4.2.1.3.1 Activity – Verify DICOM 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. Furthermore this activity is triggered automatically in a configurable interval to reexamine all configured connections. This automatic verification does not need any user interaction and comes without any graphical UI features.

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 CIRRUS photo Application Software proposes not only Verification SOP Class, but also all other SOP Classes as supported by CIRRUS photo Application Software.

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 DICOM 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.

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

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	No
Modality Worklist Information Model - FIND	5.1.4.31	ILE	1.2	SCU	No
Study Root Query/Retrieve Information Model - FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes[1]
Study Root Query/Retrieve Information Model - MOVE	5.1.4.1.2.2.2	ILE	1.2	SCU	No
Patient Root Query/Retrieve Information Model – FIND	5.1.4.1.2.1.1	ILE	1.2	SCU	Yes[1]
Modality Performed Procedure Step	3.1.2.3.3	ILE	1.2	SCU	No
Modality Performed Procedure Step Notification	3.1.2.3.5	ILE	1.2	SCU	No
Encapsulated PDF Storage	5.1.4.1.1.104.1	ILE	1.2	BOTH	No
		ELE	1.2.1	BOTH	No
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	BOTH	No

		ELE	1.2.1	BOTH	No
OP 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	BOTH	No
Multi-frame True Color Secondary Capture Image Storage	5.1.4.1.1.7.4	JPG-1	1.2.4.50	BOTH	No
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	No

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

4.2.1.3.1.3 SOP Specific Conformance for Verification SOP Class

The CIRRUS photo Application Software provides standard conformance.

4.2.1.3.2 Activity – Query Modality Worklist

An operator has two options to perform this activity.

4.2.1.3.2.1 Description and Sequencing of Activities

Option "Today's Patients - One-click query"

In this case, the Application Software performs a query with predefined query keys. The operator cannot change the query key values. The applied query keys are:

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

All matching worklist items are subject to be displayed in the GUI and - once selected by the operator - to be imported into the local database.

This default query can be manually triggered by simply opening the applications "Today's Patients" screen or by pressing the "Refresh" button therein. This default query is also triggered automatically in a configurable interval to keep the list of "Today's Patients" up to date.

To prevent the Application Software from triggering a request too often, a caching time can be configured. If so, the application won't issue new requests even if manually triggered but presents the cached results to the operator.

The "Today's Patients" screen also offers a 'Quick search' field, which allows to enter filter criteria for the presented list. This does not trigger a new query request.

Note: "Today's Patients" screen also lists non-scheduled patients, which already have a performed series for today and match any additionally entered search criteria. These patients are received by querying a remote AE. See chapter 4.2.1.3.3 Activity - Query remote AE for patients and data for details.

Option "Search in Worklist - Interactive query"

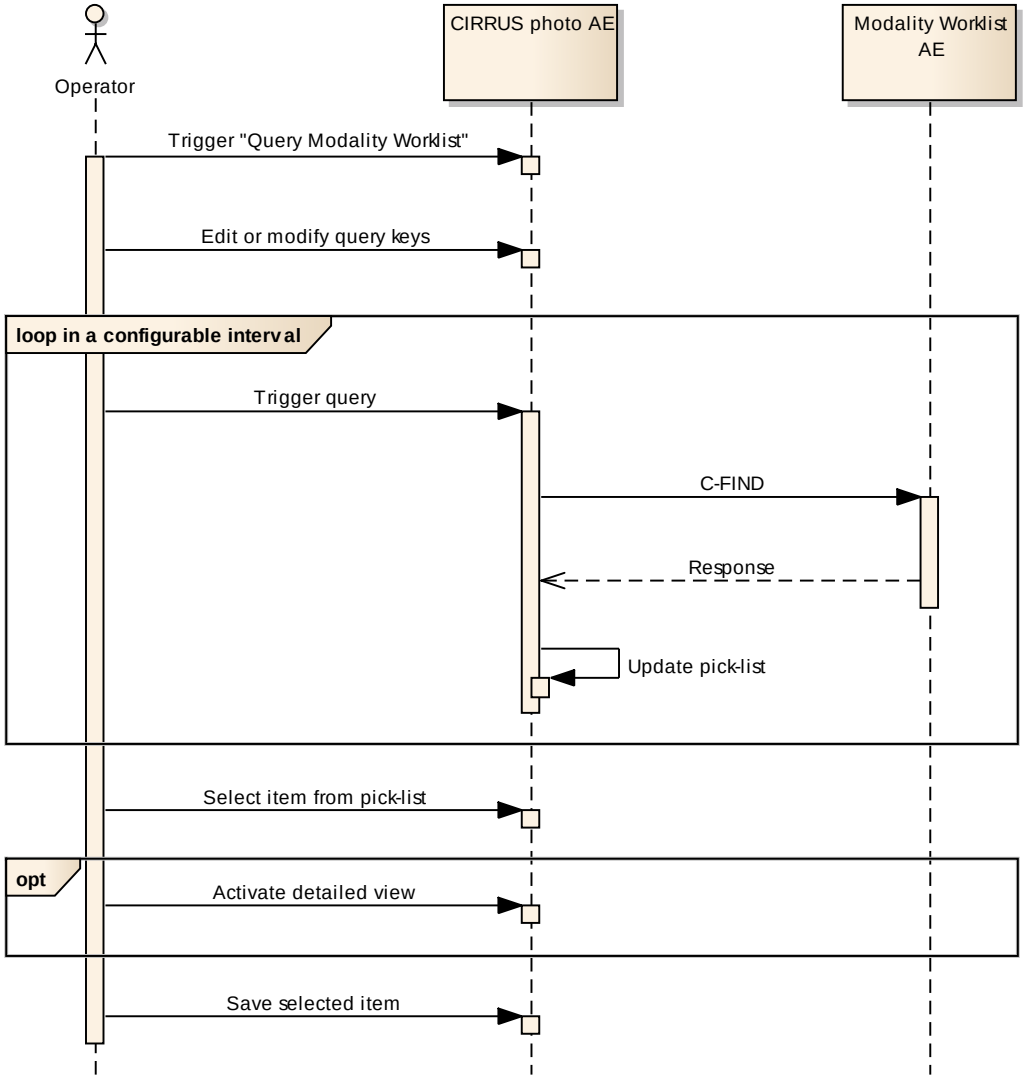


Figure 4-4 Option "Search in Worklist - Interactive query"

Trigger "Query Modality Worklist"
The activity "Query Modality Worklist" can be triggered by the operator at any time by pressing the "Search in Worklist" button. It is meaningful to perform the query when the patient arrives at the modality. Then the worklist contains latest information.

Edit or modify query keys
The Modality Worklist query offers a GUI for interactive query. The operator can change or fill in search criteria in the shown dialog. For instance, the patient name or the patient ID can be used. For more details on supported query keys see Table 4-3 Modality Worklist query key details.

Trigger query
The operator triggers the search after he or she filled in search criteria by either pressing the "Enter" key or by not typing any key for 3 seconds. The Application Software sends a DICOM C-FIND request, which contains the search criteria. The Application Software waits for the response from the partner Application Entity. Application Software will accept up to a configurable number of matches. If the number of matches oversteps this limit, the Application Software shows an information about truncated search results and a request to apply more specific query keys. Despite this warning, the operator gets results in the pick-list. After receiving the response, the pick-list is updated. The pick-list provides the most

important information for a quick overview (see Table 4-2 Attributes involved in Modality Worklist C-FIND request and response).

The operator can start over, redefine query keys and trigger the query again. This can be performed as often as required, until he or she finds the correct worklist item.

Select item in pick-list

The operator can select one worklist item in the pick-list. The selected item becomes subject for a detailed view or it can be imported into the Application Software.

Activate detailed view

The detailed view allows a closer look to the currently selected worklist item. Thus the operator can see more information about patient information and schedule information. This can be triggered by pressing the "Show worklist details" button in the dialog.

Save selected item

The operator can take over the selected item at any time by pressing the "Plan For Today" button. The data is stored in the list of today's patients.

After saving the selected item, the operator can start over. By repeating this process the operator can take over several worklist items into the local database.

After all that, the operator can start the examination of the patient and acquire scan data.

Leave dialog

The operator finally finishes the worklist query by leaving the dialog.

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

- "Modality Worklist IM - FIND" with Transfer Syntax ILE as SCU

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	No
Modality Worklist Information Model - FIND	5.1.4.31	ILE	1.2	SCU	No
Study Root Query/Retrieve Information Model - FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes[1]
Study Root Query/Retrieve Information Model - MOVE	5.1.4.1.2.2.2	ILE	1.2	SCU	No
Patient Root Query/Retrieve Information Model – FIND	5.1.4.1.2.1.1	ILE	1.2	SCU	Yes[1]
Modality Performed Procedure Step	3.1.2.3.3	ILE	1.2	SCU	No
Modality Performed Procedure Step Notification	3.1.2.3.5	ILE	1.2	SCU	No
Encapsulated PDF Storage	5.1.4.1.1.104.1	ILE	1.2	BOTH	No
		ELE	1.2.1	BOTH	No
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	BOTH	No
		ELE	1.2.1	BOTH	No
OP 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	BOTH	No
Multi-frame True Color Secondary Capture Image Storage	5.1.4.1.1.7.4	JPG-1	1.2.4.50	BOTH	No
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	No

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

4.2.1.3.2.3 SOP Specific Conformance for Modality Worklist SOP Class

Table 4-1 Modality Worklist C-FIND Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Matching is complete	0000	The Software Application stops receiving worklist items. It finally updates the pick list.
Pending	Matches are continuing	FF00, FF01	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 an A-RELEASE-RQ to the service provider.
Failure	Too Many Results	C001	If there more results than the configured limit the application software throws an error message to the user.
*	*	Any other status code	The user gets an error message.

Table 4-2 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	OQ, IQ, DEF	X	PLD		
>(0040,0003)	Scheduled Procedure Step Start Time		X	PLD		
>(0040,0002)	Scheduled Procedure Step Start Date	OQ, IQ, DEF	X	PL, PLD		
>(0008,0060)	Modality	IQ, DEF	X	PLD		
>(0040,0006)	Scheduled Performing Physicians Name		X			
>(0040,0007)	Scheduled Procedure Step Description		V	PL, PLD		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		V			X
>>(0008,0102)	Coding Scheme Designator		V			X
>>(0008,0103)	Coding Scheme Version		V			X
>>(0008,0104)	Code Meaning		V	PLD		X
>(0040,0012)	Pre-Medication		X			
>(0040,0009)	Scheduled Procedure Step ID		V			X
>(0032,1070)	Requested Contrast Agent		X			
Requested Procedure						
(0040,1001)	Requested Procedure ID	IQ	V	PL, PLD		X
(0032,1060)	Requested Procedure Description		V	PLD		X
(0032,1064)	Requested Procedure Code Sequence		X			X
>(0008,0100)	Code Value		V			X
>(0008,0102)	Coding Scheme Designator		V			X
>(0008,0103)	Coding Scheme Version		V			X
>(0008,0104)	Code Meaning		V	PLD		X
(0020,000D)	Study Instance UID		V			X

(0008,1110)	Referenced Study Sequence		X			X
>(0008,1150)	Referenced SOP Class UID		V			X
>(0008,1155)	Referenced SOP Instance UID		V			X
(0040,1003)	Requested Procedure Priority		X			
(0040,1004)	Patient Transport Arrangements		X			
(0040,1400)	Requested Procedure Comments		V	PLD		X
(0008,0050)	Accession Number	IQ	V[1]	PL, PLD		X
(0032,1032)	Requesting Physician		X			
(0008,0090)	Referring Physicians Name		V	PLD		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)	Patient's Name	IQ	V	PL, PLD, APP		X
(0010,0020)	Patient ID	IQ	V	PL, PLD, APP		X
(0010,0021)	Issuer of Patient ID		V			X
(0010,1000)	Other Patient IDs		V			X
Patient Demographic						
(0010,0030)	Patient's Birth Date		V	PLD, APP		X
(0010,0040)	Patient's Sex		V	PLD, APP		X
(0010,1030)	Patient's Weight		X			
(0040,3001)	Confidentiality Constraint on Patient Data Description		X			
(0010,2160)	Ethnic Group		X			X
(0010,4000)	Patient's Comments		V	PL		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":

OQ

A tag that is marked with OQ is used as query key in the "One-click Query" mode as provided by "Today's Patients" screen.

IQ

A tag that is marked with IQ is used as query key in the "Interactive Query" mode as provided by the "Search in Worklist" dialog.

DEF

A tag that is marked with DEF has a value assigned when the interactive Modality Worklist Query Dialog is shown the first time or when the Reset button is pushed.

Default value for Scheduled Station AET equals to Local Application Entity Title as set in instrument's DICOM configuration

Values of column "Imported":

X

The value gets imported in the application. Thus this value may have influence in Information Objects which will be created as a result of the performed examination.

V

The value is validated according to DICOM VR definition before getting imported. In case of validation fails the application software does not import the respective worklist record.

[1] Note:

Values for (0008,0050) Accession Number will only pass validation if containing characters of ASCII character set. Otherwise application software does not import the respective worklist record.

Values of column "Displayed":

PL

Values of this tag are instantly visible in the pick list.

PLD

Values of this tag are visible in the details dialog of the current selected pick list item.

APP

Values of this tag are visible in the other portions of main application, e.g. in the patient information banner.

Values of column "Modifiable":

X

A value which has been imported to the application might be modified inside 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.

Following set of tags can be used as query key in the "Search in worklist" dialog.

Table 4-3 Modality Worklist query key details

Tag	Tag Name	Description
(0010,0010)	Patient's Name	The CIRRUS photo Application Software supports family name only. The operator can use '*' or '?' as wild cards. Note: All other name components will be set automatically to "*", thus the actual query key will be "<search_pattern>^*".
(0010,0020)	Patient ID	The operator can enter a string which conforms to the Value Representation LO.
(0008,0050)	Accession Number	The operator can enter a string which conforms to the Value Representation SH.
(0040,1001)	Requested Procedure ID	The operator can enter a string which conforms to the Value Representation SH.
(0040,0100)	Scheduled Procedure Step Sequence	This attribute is the container for the tags as listed below. The sequence contains one item.
>(0040,0002)	Scheduled Procedure Step Start Date	The default value is "All dates". The operator can change the value and can even enter date ranges.
>(0008,0060)	Modality	The default value is "OP". The operator can change the value and select one value of a predefined set of values including an empty string. Possible values are "OAM", "OP", "OPM", "OPR", "OPT", "OPV", and

		"All".
>(0040,0001)	Scheduled Station AE Title	The default value is set by configuration. The operator can enter the AE Title of another device or leave the field empty.

4.2.1.3.3 Activity - Query remote AE for patients and data

4.2.1.3.3.1 Description and Sequencing of Activities

Option "Today's Patients - One-click query"

In this case, the Application Software performs a relational Patient Root based DICOM C-FIND request with predefined query keys at Series Level. The operator cannot change the query key values. The applied query keys are:

Tag	Attribute Name	Description
(0008,0021)	Series Date	Uses the date of today.

All matching query response items are subject to be displayed in the GUI along with the results from 4.2.1.3.2 Activity – Query Modality Worklist and - once selected by the operator - to be imported into the local database.

This default query can be manually triggered by simply opening the applications "Today's Patients" screen or by pressing the "Refresh" button therein. This default query is also triggered automatically in a configurable interval to keep the list of "Today's Patients" up to date.

To prevent the Application Software from triggering a request too often, a caching time can be configured. If so, the application won't issue new requests even if manually triggered but presents the cached results to the operator.

The "Today's Patients" screen also offers a 'Quick search' field, which allows to enter filter criteria for the presented list. This does not trigger a new query request.

Option "Find Patient - Interactive query"

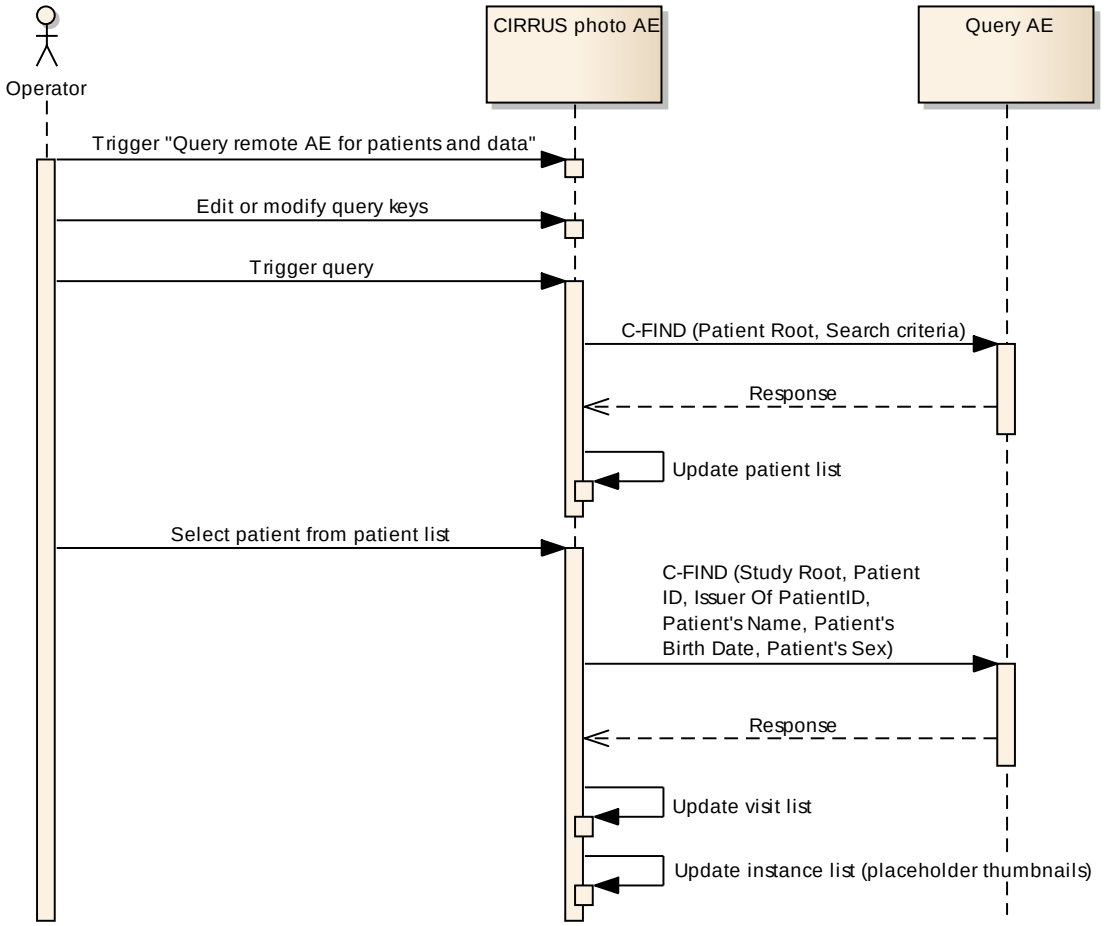


Figure 4-5 Option "Find Patient - Interactive query"

Trigger "Query remote AE for patients and data"

The activity "Query remote AE for patients and data" can be triggered by the operator at any time by activating the "Find Patient" screen.

Edit or modify query keys

The "Find Patient" screen offers a GUI for interactive query. The operator can change or fill in search criteria in the shown search fields.

The top-most search field in the "Find Patient" screen acts as a Quick Search field. Any value entered herein is applied to

- (0010,0010) Patient's Name – Family Name
- (0010,0010) Patient's Name – Given Name
- (0010,0020) Patient ID

and issued as three separate requests. The entered value is automatically wild carded to fulfill the 'contains' condition.

For more details on supported query keys see Table 4-6 Query key details.

Trigger query

The operator triggers the search after he or she filled in search criteria by either pressing the "Enter" key or by not typing any key for 3 seconds. The Application Software sends a Patient Root based DICOM C-FIND request which contains the entered search criteria. The Application Software waits for the response from the Query AE and accepts up to a configurable number of matches. If the number of matches exceeds this limit, the Application Software shows an information about truncated search results and a request to apply more specific query keys. Despite this warning, the operator gets results in the pick-list.
After receiving the response, the patient pick-list is updated. The patient pick-list provides the

most important information for a quick overview (see Table 4-5 Attributes involved in Query C-FIND request and response).

The operator can start over, redefine query keys and trigger the query again. This can be performed as often as required, until he or she finds the correct patient entry.

Important note: For this activity it is required that the SCP supports the Relational query model since Application Software does not use the Hierarchical model.

Select patient from patient list

The operator can select one patient entry from the patient list. Once the item is selected the Application Software sends a DICOM C-FIND request on Instance Level using Study Root Query SOP Class with the following query keys

- (0010,0020) Patient ID
- (0010,0021) Issuer of Patient ID
- (0010,0010) Patient's Name
- (0010,0030) Patient's Birth Date
- (0010,0040) Patient's Sex

The Application Software filters the response from the Query AE for supported instances and uses the data gathered by these filters to update a "Visit list" and an "Exam list". The "Visit list" shows a list of dates for which instances were provided in the Query response while the "Exam list" shows thumbnails for any instances available for a selected visit. In the first place these thumbnails are placeholders indicating that the actual instance is not retrieved yet to the CIRRUS photo Application Entity.

The operator can select another entry from the patient list even when an active request is still in progress. In this case another request will be started in parallel and the results from the previous request will get finished.

Important note: For this activity it is required that the SCP supports the Relational query model since Application Software does not use the Hierarchical model.

Immediately after updating both lists the Application Software automatically starts the activity "Retrieve scans, images and analyses from remote AE".

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

- "Patient Root Query/Retrieve Information Model - FIND" with Transfer Syntax ILE as SCU
- "Study Root Query/Retrieve Information Model - FIND" with Transfer Syntax ILE as SCU

Important note: For this activity it is required that the SCP supports the Relational query model since Application Software does not use the Hierarchical model.

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	No
Modality Worklist Information Model - FIND	5.1.4.31	ILE	1.2	SCU	No
Study Root Query/Retrieve Information Model - FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes[1]
Study Root Query/Retrieve Information Model - MOVE	5.1.4.1.2.2.2	ILE	1.2	SCU	No
Patient Root Query/Retrieve Information Model – FIND	5.1.4.1.2.1.1	ILE	1.2	SCU	Yes[1]
Modality Performed Procedure	3.1.2.3.3	ILE	1.2	SCU	No

Step					
Modality Performed Procedure Step Notification	3.1.2.3.5	ILE	1.2	SCU	No
Encapsulated PDF Storage	5.1.4.1.1.104.1	ILE	1.2	BOTH	No
		ELE	1.2.1	BOTH	No
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	BOTH	No
		ELE	1.2.1	BOTH	No
OP 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	BOTH	No
Multi-frame True Color Secondary Capture Image Storage	5.1.4.1.1.7.4	JPG-1	1.2.4.50	BOTH	No
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	No

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

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

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

Service Status	Further Meaning	Error Code	Behavior
Success	Matching is complete No final Identifier is supplied.	0000	The Application Software finishes receiving query results. It finally updates the pick list.
Pending	Matches are continuing	FF00, FF01	The Application Software checks whether the number of received responses overstepped the configurable limit. If the number of received responses overstepped the limit, then the Application Software sends an A-RELEASE-RQ to the service provider.
Refused	Out of Resources	A700	An error message is shown to the operator. The Application Software logs this event and gives up. The pick-list is then empty.
Failure	Identifier does not match SOP Class	A900	
Failure	Unable to process	C000 - CFFF	
Cancel	Matching terminated due to Cancel request	FE00	
*	*	Any other status code	

The following table lists attributes, which are in use during this activity. The table also explains how the attributes are involved.

Table 4-5 Attributes involved in Query C-FIND request and response

Tag	Tag Name	Query Key	Displayed in pick-list	Displayed in details
Study				
(0010,0010)	Patient's Name	X, AUTO	X	X
(0010,0020)	Patient ID	X, AUTO	X	X
(0010,0021)	Issuer of Patient ID	AUTO	X	X
(0010,0030)	Patient's Birth Date	X, RNG, AUTO	X	X
(0010,0040)	Patient's Sex	X, SEL, AUTO	X	X
(0008,0020)	Study Date	X, RNG		X
(0008,0050)	Accession Number	X		X
(0020,0010)	Study ID	X		X
(0008,0090)	Referring Physician's Name	X		X
Series				
(0008,0060)	Modality	X, SEL		X
(0020,0011)	Series Number	X		
(0040,1001)	Requested Procedure ID	X		X
(0040,0009)	Scheduled Procedure Step ID	X		X
(0040,0244)	Performed Procedure Step Start Date	X, RNG		X
(0008,0021)	Series Date	X, RNG		
Instance				
(0020,0013)	Instance Number	X		X

Values for column "Query key":

X
The attribute is used as query key. The operator can assign values to that attribute. When the operator triggers the query, the values of the query keys are transferred to the Query Service Provider. How the Query Service Provider interprets the given value is out of scope of this document.

AUTO
The CIRRUS photo application assigns automatically values to that attribute according to the current operator selection.

RNG
The operator can apply a range as value for the query key.

SEL
The operator can select a value from a given list of values.

Values for column "Displayed in pick-list":

X
After receiving query results, the value of this attribute is shown in the pick-list.

Values for column "Displayed in detail dialog":

X
The value of this attribute becomes visible in the detail dialog. The detail dialog shows attributes of the current selected item in the pick-list.

Table 4-6 Query key details

Tag	Tag Name	Description
	Patient	
(0010,0010)	Patient's Name	The default value is empty string. Only family name, middle name and given name can be used as query keys. The operator can use '*' or '?' as wild cards. This is a DICOM Standard query key on Patient level. Note: In case, only family name component is filled by user all other name components will be set automatically to "*", thus the actual query key will be "<search_pattern>^*".
(0010,0020)	Patient ID	The default value is empty string. The operator can enter each value that conforms to the Value Representation LO. This is a DICOM Standard query key on Patient level.
(0010,0021)	Issuer of Patient ID	This attribute is used as query key automatically when the operator selects a patient from the patient list and the application starts querying the remote AE for "Visits" and "Exams". The value assigned conforms to the value gathered from the previous Patient root Query. 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 default value is empty date. The operator can enter a specific value that conforms to the Value Representation DA. The operator can also select from a range of dates that might represent either a range of ages ("Age") or a range of years of birth ("Year"). 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.
(0010,0040)	Patient's Sex	The default value is empty string. The operator can select from a list of pre-defined values and the application software will convert the selection to a value that conforms to the Value Representation CS. 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.
	Study	
(0008,0050)	Accession Number	The default value is empty string. The operator can enter each value that conforms to the Value Representation SH. This is a DICOM Standard query key on Study level.
(0008,0020)	Study Date	The default value is empty date. The operator can select from a range of dates. This is a DICOM Standard query key on Study

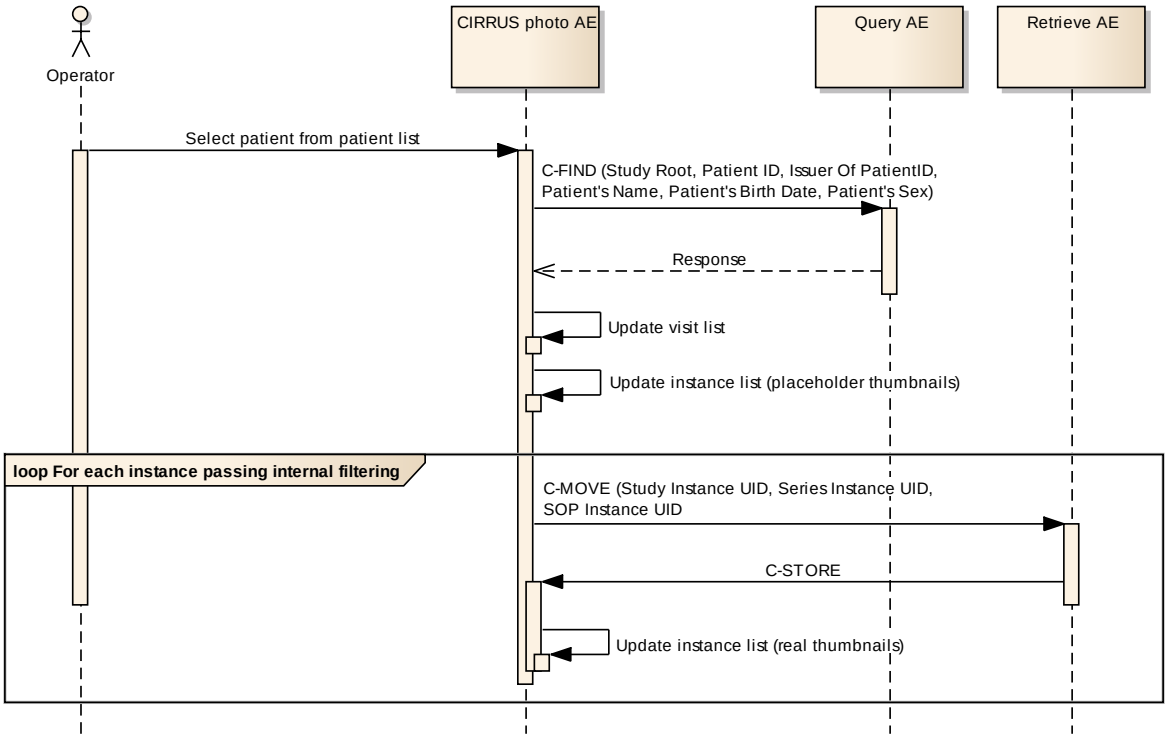
		level.
(0020,0010)	Study ID	The default value is empty string. The operator can enter each value that conforms to the Value Representation SH. This is a DICOM Standard query key on Study level.
(0008,0090)	Referring Physician's Name	The default value is empty string. Only family name can be used as query key. This is a DICOM Optional query key on Study level, thus the effect of this query key on the query depends on Service Provider implementation.
Series		
(0008,0060)	Modality	The default value is empty string. The operator can select from a list of pre-defined values and the application software will convert the selection to a value that conforms to the Value Representation CS. This is a DICOM Standard query key on Series level.
(0020,0011)	Series Number	The default value is empty string. The operator can enter each value that conforms to the Value Representation IS. This is a DICOM Standard query key on Series level.
(0040,1001)	Requested Procedure ID	The default value is empty string. The operator can enter each value that conforms to the Value Representation SH. 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.
(0040,0009)	Scheduled Procedure Step ID	The default value is empty string. The operator can enter each value that conforms to the Value Representation SH. 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.
(0040,0244)	Performed Procedure Step Start Date	The default value is empty date. The operator can select from a range of dates. 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.
(0008,0021)	Series Date	This attribute is denoted as "Visit Date" in the application software's UI. The default value is empty date. The operator can select from a range of dates. 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.
Instance		
(0020,0013)	Instance Number	The default value is empty string. The operator can enter each value that conforms to the Value Representation IS.

		This is a DICOM Standard query key on Instance level.

4.2.1.3.4 Activity – Retrieve scans, images and analyses from remote AE

4.2.1.3.4.1 Description and Sequencing of Activities

This activity is indirectly triggered whenever the operator selects one item from the patient pick-list presented within either activity "Query Modality Worklist" ("Today's Patients" screen) or activity "Query remote AE for patients and data" ("Find Patient" screen).



Select patient from patient list

The operator can select one patient entry from the patient pick-list list. Once the item is selected the Application Software sends a DICOM C-FIND request on Instance Level using Study Root Query SOP Class with the following query keys

- (0010,0020) Patient ID
- (0010,0021) Issuer of Patient ID
- (0010,0010) Patient's Name
- (0010,0030) Patient's Birth Date
- (0010,0040) Patient's Sex

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

- (0008,0060) Modality
- (0008,1090) Manufacturer's Model Name
- (0008,0008) Image Type
- (0008,0016) SOP Class UID
- (0405,xx01) Pattern Type

Only instances fulfilling the following conditions will be accepted:

- Manufacturers Model Name must always contain either 'CIRRUS photo' or 'VISUCAM'
- Raw Data instances must be of Modality 'OPT' and must contain supported scan or analysis data

- Multi-Frame True Color Secondary Capture instances must contain the Image Type 'B SCAN'
- Ophthalmic Photography 8 Bit instances must be of Modality 'OP'

All instances passing the applied filters are presented to the user in a "Visit list" and an "Exam list". The "Visit list" shows a list of dates for which instances were provided in the Query response while the "Exam list" shows thumbnails for any instances available for a selected visit. In the first place these thumbnails are placeholders indicating that the actual instance is not retrieved yet to the CIRRUS photo Application Entity.

Immediately after updating both lists the Application Software automatically starts to initiate a C-MOVE request for each instance that passed the filtering. The retrieval of instances is ordered by series date and starts with most recent instances.

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

- "Study Root Query/Retrieve Information Model - MOVE" with Transfer Syntax ILE as SCU
- "Raw Data Storage" with Transfer Syntax ELE or ILE as SCP
- "OP 8 Bit Image Storage" with Transfer Syntax JPG-1 as SCP
- "Multi-frame True Color Secondary Capture Image Storage" with Transfer Syntax JPG-1 as SCP

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	No
Modality Worklist Information Model - FIND	5.1.4.31	ILE	1.2	SCU	No
Study Root Query/Retrieve Information Model - FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes[1]
Study Root Query/Retrieve Information Model - MOVE	5.1.4.1.2.2.2	ILE	1.2	SCU	No
Patient Root Query/Retrieve Information Model – FIND	5.1.4.1.2.1.1	ILE	1.2	SCU	Yes[1]
Modality Performed Procedure Step	3.1.2.3.3	ILE	1.2	SCU	No
Modality Performed Procedure Step Notification	3.1.2.3.5	ILE	1.2	SCU	No
Encapsulated PDF Storage	5.1.4.1.1.104.1	ILE	1.2	BOTH	No
		ELE	1.2.1	BOTH	No
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	BOTH	No
		ELE	1.2.1	BOTH	No
OP 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	BOTH	No
Multi-frame True Color Secondary Capture Image Storage	5.1.4.1.1.7.4	JPG-1	1.2.4.50	BOTH	No
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	No

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

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

Table 4-7 Retrieve C-MOVE Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Sub-operations Complete No Failures	0000	The Application Software returns from this activity.
Pending	Sub-operations are continuing	FF00	This is not expected since the Application Software calls C-MOVE instance by instance.
Refused	Out of Resources Unable to calculate number of matches	A701	An error message is shown to the operator. The Application Software logs this event and continues with processing next C-MOVE operation.
Refused	Out of Resources Unable to perform sub-operations	A702	
Refused	Move Destination unknown	A801	
Failure	Identifier does not match SOP Class	A900	
Failure	Unable to process	C000 - CFFF	
Success	Sub-operations Complete One or more Failures	B000	
Cancel	Sub-operations terminated due to Cancel Indication	FE00	
*	*	Any other status code	

4.2.1.3.5 Activity – Acquire scans and images

Operator can trigger "Acquire scans and images" at any time if no other activity is in progress.

This activity has no direct relation to DICOM messaging.

During this activity, the Application Software creates scan and image data. It also creates default parameters for an analysis.

The created data is subject to be archived within next "Store scans, images, analyses and reports to remote AE"-activity call.

During this activity the activities

- "Query Modality Worklist"
- "Query remote AE for patients and data"
- "Retrieve scans and images"
- "Store scan, images, analyses and reports"

will be paused.

4.2.1.3.6 Activity – Analyze scans and images

Operator can trigger "Analyze scans and images" at any time if no other activity is in progress.

This activity has no direct relation to DICOM messaging.

During this activity, the Application Software creates new parameter data sets for an analysis and/or new images.

The created data is subject to be archived within next "Store scans, images, analyses and reports to remote AE"-activity call.

During this activity the "Store scan, images, analyses and reports" activity will be paused.

4.2.1.3.7 Activity – Create reports

Operator can trigger "Create reports" within either "Review Image" or "Analyze OCT" screen.

This activity has no direct relation to DICOM messaging.

During this activity, the Application Software creates new parameter data sets for an analysis and/or new images.

The created data is subject to be archived within next "Store scans, images, analyses and reports to remote AE"-activity call.

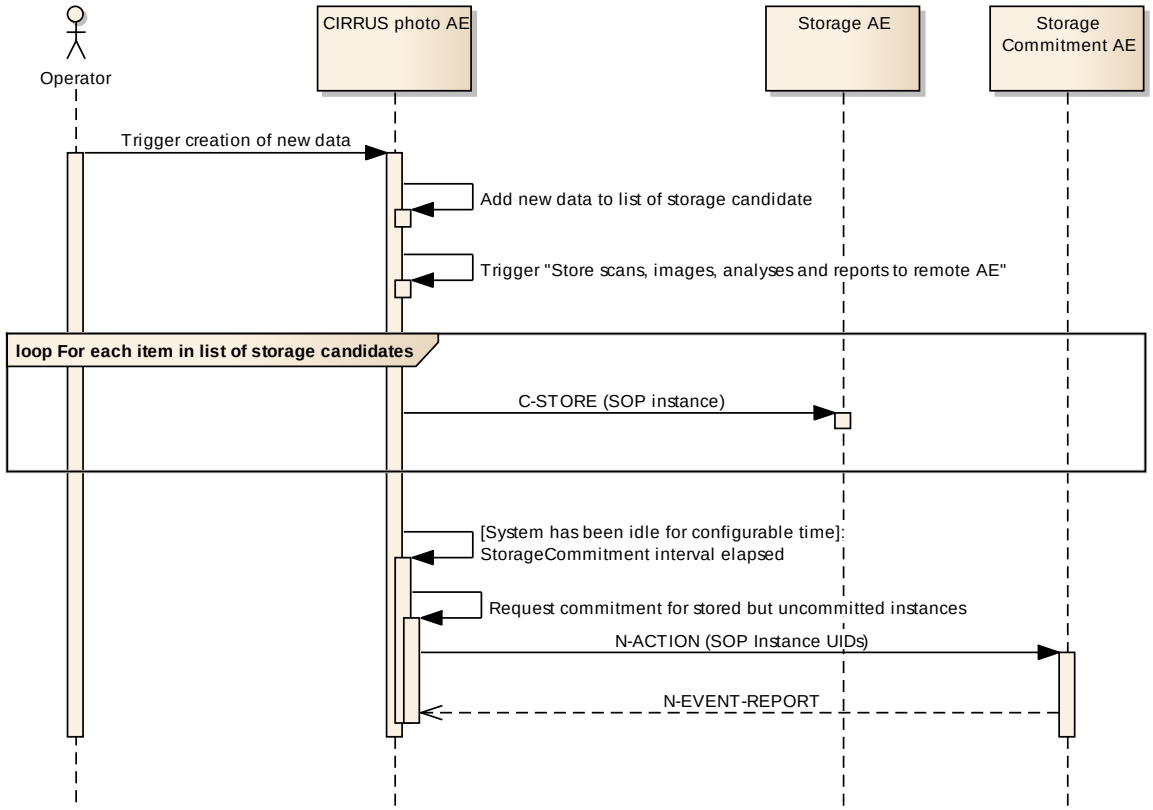
4.2.1.3.8 Activity – Store scans, images, analyses and reports to remote AE

This activity cannot be triggered manually by the operator but is triggered automatically in the background whenever new data has been created and neither "Acquire scans and images" nor "Analyze scans and images" is active.

This activity will pause for benefit of high priority activities (e.g. "Acquire scans and images") and resume after such activities has been finished.

After a configurable amount of time, the Application Software asks the configured Storage Commitment Provider to take over responsibility on data persistence for the data previously transferred by the "Archive data" activity. When storage is committed the operator is allowed to enable removal of this data from the modality. This will typically done in the shutdown routine.

4.2.1.3.8.1 Description and Sequencing of Activities



Trigger "Store scans, images, analyses and reports to remote AE"

This activity cannot be triggered manually by the operator but is triggered automatically in the background whenever new data has been created and neither "Acquire scans and images" nor "Analyze scans and images" is active.

Furthermore the application software triggers this activity automatically after a configurable interval has been elapsed and there's new data available that has not been stored.

Once triggered, the application software transfers all data that has been stored locally but has not yet transferred to the configured Storage AE . It also re-transfers data for which archiving has failed in a previous attempt or where the storage commitment has not been negotiated successfully.

The operator can pause this activity when triggering either "Acquire scans and images" or "Analyze scans and images". Once these activities are finished, storing is resumed.

To verify that the data has been archived, the Application Software can be set up to ask the configured Storage Commitment AE in a configurable interval to commit storage of instances.

Data that has been successfully archived (stored and commitment of storage) is subject to be deleted at shutdown.

4.2.1.3.8.2 Proposed Presentation Contexts

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

- Encapsulated PDF with Transfer Syntax ELE (Transfer Syntax ILE as fallback) as SCU
- Raw Data Storage with Transfer Syntax ELE (Transfer Syntax ILE as fallback) as SCU
- OP 8Bit Image Storage with Transfer Syntax JPG-1 as SCU
- Multi-frame True Color SC Image Storage with Transfer Syntax JPG-1 as SCU
- Storage Commitment Push Model with Transfer Syntax ILE as SCU

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	No
Modality Worklist Information Model - FIND	5.1.4.31	ILE	1.2	SCU	No
Study Root Query/Retrieve Information Model - FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes[1]
Study Root Query/Retrieve Information Model - MOVE	5.1.4.1.2.2.2	ILE	1.2	SCU	No
Patient Root Query/Retrieve Information Model – FIND	5.1.4.1.2.1.1	ILE	1.2	SCU	Yes[1]
Modality Performed Procedure Step	3.1.2.3.3	ILE	1.2	SCU	No
Modality Performed Procedure Step Notification	3.1.2.3.5	ILE	1.2	SCU	No
Encapsulated PDF Storage	5.1.4.1.1.104.1	ILE	1.2	BOTH	No
		ELE	1.2.1	BOTH	No
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	BOTH	No
		ELE	1.2.1	BOTH	No
OP 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	BOTH	No
Multi-frame True Color Secondary Capture Image Storage	5.1.4.1.1.7.4	JPG-1	1.2.4.50	BOTH	No
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	No

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

4.2.1.3.8.3 SOP Specific Conformance for Storage SOP Classes

Table 4-8 Storage C-STORE Response Status Handling Behavior

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The Application Software continues storing next instance if there is at least one instance left in the set of instances.
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	
Warning	Elements Discarded	B006	
Refused	Out of Resources	A700 – A7FF	The Application Software continues storing next instance if there is at least one instance left in the set of instances. Afterwards application software performs a configurable number of retrials to store the failed instance. If all retrials fail, an error message is shown to the operator, the Application Software logs this event and gives up for this instance.
Error	Data Set does not match SOP Class	A900 – A9FF	An error message is shown to the operator. The Application Software logs this event and gives up for this instance. Application software continues storing next instance if there is at least one instance left in the set of instances.
Error	Cannot Understand	C000 – CFFF	
*	*	Any other status value	

4.2.1.3.8.4 SOP Specific Conformance for Storage Commitment SOP Class

4.2.1.3.8.4.1 Storage Commitment Operations (N-ACTION)

The Application Software will request storage commitment for instances of the Raw Data (scan and analysis data), Ophthalmic Photography, Multi-frame True Color Secondary Capture and Encapsulated PDF Image Storage if the Remote AE is configured as Storage Commitment Provider and a presentation context for the Storage Commitment Push Model has been accepted.

The Storage Commitment Request addresses at least one SOP Instance and at maximum 500 SOP instances.

The behavior of the Application Software when encountering status codes in a N-ACTION response is summarized in the table below:

Table 4-9 Storage Commitment N-ACTION Response Status Handling Behavior

Service Status	Further Meaning	Status Code	Behavior
Failure	Processing failure	0110	The SOP Instance is considered as not being committed. For a configurable amount of re-trials the SOP Instance is subject of a future Storage Commitment service request. It will be included again within next call of these activities. In case of failure occurs repeatedly a warning message is shown to the operator.
Failure	Resource limitation	0213	
Failure	No such argument	0114	The SOP Instance is considered as not being committed. For a configurable amount of re-

Failure	Invalid argument value	0115	trials the SOP Instance is subject of a future Storage Commitment service request. It will be included again within next call of these activities. An error message is shown to the operator.
Failure	Invalid object instance	0117	
Failure	No such SOP class	0118	
Refused	SOP class not supported	0122	
Failure	No such action type	0123	
Failure	Unrecognized operation	0211	
Failure	Mistyped argument	0212	
Success	Success	0000	The Application Software will wait for an incoming N-EVENT-REPORT within a configurable time.
*	*	Any other status value	The SOP Instance is considered as not being committed. For a configurable amount of re-trials the SOP Instance is subject of a future Storage Commitment service request. It will be included again within next call of these activities.

4.2.1.3.8.4.2 Storage Commitment Communication Failure Behavior

If the Application Software runs in a timeout or if the association is aborted by the provider or network layer, or if waiting duration for Storage Commitment N-EVENT-REPORT oversteps a configurable time limit then the related SOP Instance is considered as not being committed. Then the SOP Instance is subject of a future Storage Commitment service call. It will be included again within next call of this activity.

In addition to that, the Application Software writes the SOP Instance UID to the log file, together with the failure reason.

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

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	No

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 - Retrieve scans, images and analyses from remote AE

This chapter describes the aspect of association acceptance of the activity "Retrieve scans, images and analyses from remote AE". The activity retrieves images, scan data and analysis data belonging to a selected patient.

4.2.1.4.2.1 Description and Sequencing of Activities

The description and sequencing of activities is covered by chapter "4.2.1.3.4 Activity – Retrieve scans, images and analyses from remote AE".

4.2.1.4.2.2 Accepted Presentation Contexts

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	No
Encapsulated PDF Storage	5.1.4.1.1.104.1	ILE	1.2	BOTH	No
		ELE	1.2.1	BOTH	No
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	BOTH	No
		ELE	1.2.1	BOTH	No
OP 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	BOTH	No
Multi-frame True Color Secondary Capture Image Storage	5.1.4.1.1.7.4	JPG-1	1.2.4.50	BOTH	No

4.2.1.4.2.3 SOP Specific Conformance for Storage SOP Class as SCP

The Application Software AE provides standard conformance.

4.2.1.4.3 Activity – Store scans, images, analyses and reports to remote AE

This chapter describes the aspect of association acceptance of the activity "Store scans, images, analyses and reports to remote AE". The activity stores images, reports, scan data and analysis data created at the modality and requests a storage commitment afterwards.

4.2.1.4.3.1 Description and Sequencing of Activities

The description and sequencing of activities is covered by chapter "4.2.1.3.8 Activity – Store scans, images, analyses and reports to remote AE".

4.2.1.4.3.2 Accepted Presentation Contexts

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	No
Encapsulated PDF Storage	5.1.4.1.1.104.1	ILE	1.2	BOTH	No
		ELE	1.2.1	BOTH	No
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	BOTH	No
		ELE	1.2.1	BOTH	No

OP 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	BOTH	No
Multi-frame True Color Secondary Capture Image Storage	5.1.4.1.1.7.4	JPG-1	1.2.4.50	BOTH	No
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	No

4.2.1.4.3.3 SOP Specific Conformance for Storage SOP Class as SCP

The Application Software AE provides standard conformance.

4.2.1.4.3.4 SOP Specific Conformance for Storage Commitment SOP Class

4.2.1.4.3.4.1 Storage Commitment Operations (N-EVENT-REPORT)

The Application Software is capable of receiving an N-EVENT-REPORT notification if it has successfully negotiated a Presentation Context for the Storage Commitment Push

The behavior of Application Software when receiving Event Types within the N-EVENT-REPORT is summarized in the table below.

Table 4-10 Storage Commitment N-EVENT-REPORT Request Failure Reasons

Meaning	Failure Reason	Behavior
Processing failure	0110	The SOP Instance is considered as not being archived and will be subject of a future Storage activity. The SOP Instance is also considered as not being committed. For a configurable amount of re-trials the SOP Instance is subject of a future Storage Commitment service request. It will be included again within next call of these activities. In addition, the application software writes the SOP Instance UID to the log file with the failure reason.
No such object instance	0112	
Resource limitation	0213	
Referenced SOP Class not supported	0122	The SOP Instance is considered as not being committed. No additional re-trials will be performed. The application software writes the SOP Instance UID to the log file with the failure reason.
Class / Instance conflict	0119	
Duplicate transaction UID	0131	The SOP Instance is considered as not being committed. For a configurable amount of re-trials the SOP Instance is subject of a future Storage Commitment service request. It will be included again within next call of these activities. In addition, the application software writes the SOP Instance UID to the log file with the failure reason.

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

Application software does only support IPv4 and does not support any IPv6 features.

4.4 Configuration

Local application entity and remote application entity information can be configured with the DICOM Configuration Tool accessible through the menu "Tools/Settings/Network/DICOM". There is only one single Application Entity Title used for the instrument Software Application.

It is also possible to configure intervals, timeouts, institution settings, and worklist item limit parameters via Application Software, configuration tool and configuration file.

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 Installation Personnel.

4.4.1.1 Local AE Titles

The IP is not configurable by the Configuration Tool. The IP is administrated by the Operating System. If the Application Software is running on a host with more than one network connection, the user should select the loopback adapter from the list of IP addresses. The Application Entity Title as well as the port number is configurable. The default port number is 11112.

4.4.1.2 Remote AE Titles

The mapping of external AE Titles to TCP/IP addresses and ports is configurable. The CIRRUS photo 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 DICOM Configuration tool allows to deactivate connection to a certain Application Entity by leaving its configuration fields for host name or IP, the Port and the Application Entity Title blank.

4.4.2 Parameters

4.4.2.1 General Parameters

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

Table 4-11 Configuration General Parameters Table

Parameter	Configurable (Yes/No)	Default Value
General Parameters		
DIMSE RSP Timeout	Yes (10 – 60 sec.) ➔ Tools/Settings/Network/DICOM	20 sec.
Network Timeout	Yes (5-20 sec.) ➔ Tools/Settings/Network/DICOM	20 sec.
Max. Association Idle Time	Yes (10 – 60 sec.) ➔ Tools/Settings/Network/DICOM	30 sec
(0008,0080) Institution Name	Yes ➔ Tools/Settings/Device	
(0008,1040) Institutional Department Name	Yes ➔ Tools/Settings/Device	
(0008,0081) Institution Address	Yes ➔ Tools/Settings/Device	
(0008,1010) Station Name	Yes ➔ Tools/Settings/Device	
(0008,1070) Operator's Name	Yes ➔ Tools/Settings/User Management	

4.4.2.2 AE Specific Parameters

The AE specific parameters are only used for associations to the named AE.

Parameter	Configurable (Yes/No)	Default Value
Verification SCU Parameters		
Verification Refresh (C-ECHO) Interval	Yes (0 [=off] – 720 min.) ➔ userconfig.xml	60 min.
Modality Worklist SCU Parameters		
Today's Patient List Refresh Rate (Modality Worklist Polling Interval)	Yes (1 min. – 60 min.) ➔ Tools/Settings/Patient Management	10 min.
Maximum Query Responses (Modality Worklist Information Model)	Yes (10 – 999) ➔ Tools/Settings/Network/DICOM	100
Patient Root Q/R and Study Root Q/R SCU Parameters		
Maximum Query Responses (Patient Root Query/Retrieve Information Model and Study Root Query/Retrieve Information Model)	Yes (10 – 999) ➔ Tools/Settings/Network/DICOM	100
Allow unconstraint query	Yes (On/Off) ➔ userconfig.xml	On
Extended Negotiation – relational query support negotiation (Patient Root Query/Retrieve Information Model and Study Root Query/Retrieve Information Model)	Yes (On/Off) ➔ Tools/Settings/Network/DICOM	On
Query Response Caching Time (Today's Patients) (Patient Root Query/Retrieve Information Model)	Yes (1 min. – 60 min.) ➔ userconfig.xml	3 min.
Query Response Caching Time (Find Patients) (Patient Root Query/Retrieve Information Model)	Yes (1 min. – 60 min.) ➔ userconfig.xml	5 min.
Storage SCU Parameters		
Number of retrials on error	Yes (0 – 10) ➔ userconfig.xml	2
Interval of automatic storage of non-archived instances	Yes (1 min. – 720 min.) ➔ userconfig.xml	10 min.
Required idle time before automatic storage of non-archived instances	Yes (1 min. – 720 min.) ➔ userconfig.xml	5 min.
Storage Commitment SCU Parameters		
Storage Commitment enable/disable	Yes (On/Off) ➔ userconfig.xml	On
Number of retrials on error	Yes (0 – 10) ➔ userconfig.xml	2
Interval of storage commitment requests for non-committed instances	Yes (1 min. – 720 min.) ➔ userconfig.xml	15 min.
Required idle time before storage	Yes (1 min. – 720 min.)	5 min.

commitment requested for non-committed instances	➔ userconfig.xml	
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 CIRRUS photo Application Software.

For further information on "Offline media file based export / import of images and reports" see chapter 4.1 Implementation Model.

6 Support Of Character Sets

All application entities described in the previous chapters support UTF-8 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 CIRRUS photo Application Software do not support any specific security measures.

It is assumed that CIRRUS photo 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 CIRRUS photo Application Software.
- Firewall or router protections to ensure that CIRRUS photo 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 (PoV):

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

Attribute value is generated from user input.

AUTO

Attribute value is generated automatically.

MWL, MPPS, etc.

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

SRQ

Attribute value is the same as the value received using a DICOM service such as Study Root Query.

CONFIG

Attribute value is a configurable parameter.

ACQUISITION

Attribute value is generated by data acquisition process. Includes image and data related to image.

ANALYSIS

Attribute value is generated by application or by user when images are reviewed or OCT scans are analysed.

8.1.1.1 Encapsulated PDF IOD

IE	Module	Usage
Patient		
	Patient	ALWAYS
Study		
	General Study	ALWAYS
Series		
	Encapsulated Document Series	ALWAYS
Equipment		
	General Equipment	ALWAYS
	SC Equipment	ALWAYS
	Czm Encapsulated Pdf Series Extension	ALWAYS
Encapsulated Document		
	Encapsulated Document	ALWAYS
	SOP Common	ALWAYS

Table 8-1 Encapsulated PDF IOD - Module "Patient"

Tag	Type	VR	Name	Description	PoV	Source
(0010,0010)	2	PN	Patient's Name	Patient's full name.	ALWAYS	MWL, SRQ, USER
(0010,0020)	2	LO	Patient ID	Primary hospital identification number or code for the patient.	ALWAYS	MWL, SRQ, USER
(0010,0021)	3	LO	Issuer of Patient ID	Identifier of the Assigning Authority that issued the Patient ID.	ANAP	MWL, SRQ, AUTO
(0010,0030)	2	DA	Patient's Birth Date	Birth date of the patient.	ALWAYS	MWL, SRQ, USER
(0010,0040)	2	CS	Patient's Sex	Sex of the named patient. Enumerated Values: M = male F = female O = other	ALWAYS	MWL, SRQ, USER
(0010,1000)	3	LO	Other Patient IDs	Other identification numbers or codes used to identify the patient.	ANAP	MWL, SRQ
(0010,2160)	3	SH	Ethnic Group	Ethnic group or race of the patient.	ANAP	SRQ
(0010,4000)	3	LT	Patient Comments	User-defined additional information about the patient.	ANAP	MWL, SRQ, USER

Table 8-2 Encapsulated PDF IOD - Module "General Study"

Tag	Type	VR	Name	Description	PoV	Source
(0020,000D)	1	UI	Study Instance UID	Unique identifier for the Study	ALWAYS	MWL, SRQ, AUTO
(0008,0020)	2	DA	Study Date	Date the Study started. Date, when procedure step was started.	ALWAYS	AUTO
(0008,0030)	2	TM	Study Time	Time the Study started.	ALWAYS	AUTO

				Time, when procedure step was started.		
(0008,0090)	2	PN	Referring Physician's Name	Name of the patient's referring physician.	VNAP	MWL
(0020,0010)	2	SH	Study ID	User or equipment generated Study identifier. *In scheduled case the source attribute for this value is Requested Procedure ID* *In unscheduled case the value is a Equipment generated Study identifier*	ALWAYS	MWL, SRQ, AUTO
(0008,0050)	2	SH	Accession Number	A RIS generated number that identifies the order for the Study. *Value does not exist in unscheduled case.*	VNAP	MWL
(0008,1030)	3	LO	Study Description	Institution-generated description or classification of the Study (component) performed. *In scheduled case the source attribute for this value is Requested Procedure Description.* *Value does not exist in unscheduled case.*	VNAP	MWL, SRQ
(0008,1110)	3	SQ	Referenced Study Sequence	A sequence that provides reference to a Study SOP Class/Instance pair. The sequence may have zero or more Items.	ANAP	MWL
>(0008,1150)	1	UI	Referenced SOP Class UID	Uniquely identifies the referenced SOP Class.	ALWAYS	MWL
>(0008,1155)	1	UI	Referenced SOP Instance UID	Uniquely identifies the referenced SOP Instance.	ALWAYS	MWL
(0008,1032)	3	SQ	Procedure Code Sequence	A Sequence that conveys the type of procedure performed. One or more Items may be included in this Sequence. *Attribute does not exist in unscheduled case.*	ANAP	MWL
>(0008,0100)	1	SH	Code Value	See NEMA PS3.3 Section 8.1.	ALWAYS	MWL
>(0008,0102)	1	SH	Coding Scheme Designator	See NEMA PS3.3 Section 8.2.	ALWAYS	MWL
>(0008,0103)	1C	SH	Coding Scheme Version	Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. *See chapter "8.3 Coded Terminology and Templates"*	VNAP	MWL
>(0008,0104)	1	LO	Code Meaning	See NEMA PS3.3 Section 8.3.	ALWAYS	MWL

Table 8-3 Encapsulated PDF IOD - Module "Encapsulated Document Series"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0060)	1	CS	Modality	The modality appropriate for the encapsulated document. This Type definition shall override the definition in the SC Equipment Module. *Value can be OP or OPT:* *OCT Analysis report = OPT* *Image Review report = OP*	ALWAYS	AUTO
(0020,000E)	1	UI	Series Instance UID	Unique identifier of the Series. *"1.2.276.0.75.2.1.51.2.2" extended by machine identifier and time information*	ALWAYS	AUTO
(0020,0011)	1	IS	Series Number	A number that identifies the Series.	ALWAYS	AUTO
(0040,0275)	3	SQ	Request Attributes Sequence	Sequence that contains attributes from the Imaging Service Request. The sequence may have one or more Items. *The Request Attributes Sequence is only included in Scheduled Case. In unscheduled case it will not be included.*	ANAP	MWL
>(0040,1001)	1C	SH	Requested Procedure ID	Identifier that identifies the Requested Procedure in the Imaging Service Request. Required if procedure was scheduled. May be present otherwise. Note: The condition is to allow the contents of this macro to be present (e.g., to convey the reason for the procedure, such as whether a mammogram is for screening or diagnostic purposes) even when the procedure was not formally scheduled and a value for this identifier is unknown, rather than making up a dummy value.	ALWAYS	MWL
>(0032,1060)	3	LO	Requested Procedure Description	Institution-generated administrative description or classification of Requested Procedure.	VNAP	MWL
>(0040,0009)	1C	SH	Scheduled Procedure Step ID	Identifier that identifies the Scheduled Procedure Step. Required if procedure was scheduled. Note: The condition is to allow the contents of this macro to be present (e.g., to convey the reason for the procedure, such as whether a mammogram is for screening or diagnostic purposes) even when the procedure step was not formally scheduled and a value for this identifier is unknown, rather than making up a dummy value.	ALWAYS	MWL
>(0040,0007)	3	LO	Scheduled Procedure Step Description	Institution-generated description or classification of the Scheduled Procedure Step to be performed.	VNAP	MWL
>(0040,0008)	3	SQ	Scheduled Protocol Code Sequence	Sequence describing the Scheduled Protocol following a specific coding scheme. This sequence contains one or more Items.	ANAP	MWL
>>(0008,0100)	1	SH	Code Value	See NEMA PS3.3 Section 8.1.	ALWAYS	MWL
>>(0008,0102)	1	SH	Coding Scheme	See NEMA PS3.3 Section 8.2.	ALWAYS	MWL

			Designator			
>>(0008,0103)	1C	SH	Coding Scheme Version	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise.	VNAP	MWL
>>(0008,0104)	1	LO	Code Meaning	See NEMA PS3.3 Section 8.3.	ALWAYS	MWL
(0040,0253)	3	SH	Performed Procedure Step ID	User or equipment generated identifier of that part of a Procedure that has been carried out within this step.	ALWAYS	AUTO
(0040,0244)	3	DA	Performed Procedure Step Start Date	Date on which the Performed Procedure Step started.	ALWAYS	AUTO
(0040,0245)	3	TM	Performed Procedure Step Start Time	Time on which the Performed Procedure Step started.	ALWAYS	AUTO
(0040,0254)	3	LO	Performed Procedure Step Description	Institution-generated description or classification of the Procedure Step that was performed. *In unscheduled case the attribute value = "Report".* *In scheduled case the attribute has the same value as for Requested Procedure Description (0032,1060)*	ANAP	AUTO

Table 8-4 Encapsulated PDF IOD - Module "General Equipment"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0070)	2	LO	Manufacturer	Manufacturer of the equipment that produced the composite instances *"Carl Zeiss Meditec"*	ALWAYS	AUTO
(0008,0080)	3	LO	Institution Name	Institution where the equipment that produced the composite instances is located.	VNAP	CONFIG
(0008,0081)	3	ST	Institution Address	Mailing address of the institution where the equipment that produced the composite instances is located.	ANAP	CONFIG
(0008,1010)	3	SH	Station Name	User defined name identifying the machine that produced the composite instances.	VNAP	CONFIG
(0008,1040)	3	LO	Institutional Department Name	Department in the institution where the equipment that produced the composite instances is located.	ANAP	CONFIG
(0008,1090)	3	LO	Manufacturer's Model Name	Manufacturer's model name of the equipment that produced the composite instances. *"CIRRUS photo 600" or* *"CIRRUS photo 800"*	ALWAYS	AUTO
(0018,1000)	3	LO	Device Serial Number	Manufacturer's serial number of the equipment that produced the composite instances. Note: This identifier corresponds to the device that actually created the images, such as a CR plate reader or a CT console, and may not be sufficient to identify all of the equipment in the imaging chain, such as the	ALWAYS	AUTO

				generator or gantry or plate.		
(0018,1020)	3	LO	Software Version(s)	Manufacturer's designation of software version of the equipment that produced the composite instances. "2.0.0.38309" and higher versions "2.0.x.y" where x denotes a patch version and y denotes a build version	ALWAYS	AUTO

Table 8-5 Encapsulated PDF IOD - Module "SC Equipment"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0064)	1	CS	Conversion Type	Describes the kind of image conversion. Defined Terms : DV = Digitized Video DI = Digital Interface DF = Digitized Film WSD = Workstation SD = Scanned Document SI = Scanned Image DRW = Drawing SYN = Synthetic Image *Always "SYN" for Synthetic Image*	ALWAYS	AUTO

Table 8-6 Encapsulated PDF IOD - Module "Czm Encapsulated Pdf Series Extension"

Tag	Type	VR	Name	Description	PoV	Source
(0020,0060)	3	CS	Laterality	Laterality of (paired) body part examined. Enumerated Values: R = right, L = left, B = both	ALWAYS	ACQUSITION, ANALYSIS

Table 8-7 Encapsulated PDF IOD - Module "Encapsulated Document"

Tag	Type	VR	Name	Description	PoV	Source
(0020,0013)	1	IS	Instance Number	A number that identifies this SOP Instance. The value shall be unique within a series. *Always "1" since there is always only one instance per series.*	ALWAYS	AUTO
(0008,0023)	2	DA	Content Date	The date the document content creation was started.	ALWAYS	AUTO
(0008,0033)	2	TM	Content Time	The time the document content creation was started.	ALWAYS	AUTO
(0008,002A)	2	DT	Acquisition Datetime	The date and time that the original generation of the data in the document started.	ALWAYS	AUTO
(0028,0301)	1	CS	Burned In Annotation	Indicates whether or not the encapsulated document contains sufficient burned in annotation to identify the patient and date the data was acquired. Enumerated Values: YES NO Identification of patient and date as text in an encapsulated document (e.g., in an XML attribute or element) is equivalent to "burned in annotation". A de-identified document may use the value NO. *Always "YES" (since there is enough information to identify the patient)*	ALWAYS	AUTO
(0042,0013)	1C	SQ	Source Instance Sequence	A sequence that identifies the set of Instances that were used to derive the encapsulated document. One or more Items may be included in this Sequence.	ALWAYS	ANALYSIS

				Required if derived from one or more DICOM Instances. May be present otherwise.		
>(0008,1150)	1	UI	Referenced SOP Class UID	Uniquely identifies the referenced SOP Class.	ALWAYS	ANALYSIS
>(0008,1155)	1	UI	Referenced SOP Instance UID	Uniquely identifies the referenced SOP Instance.	ALWAYS	ANALYSIS
(0042,0010)	2	ST	Document Title	The title of the document. Note: In the case of a PDF encapsulated document, this may be the value of the "Title" entry in the "Document Information Directory" as encoded in the PDF data. *1.) For OCT analysis reports of type ANALYSIS_OU_ONH_AND_RNFL or ANALYSIS_OU_RNFL_THICKNESS:* *"Cirrus_" + <eye site> + "_" + <analysis name>* *where* *- <eye site> = "OD", "OS", or "OU"* *- <analysis name> = "RFNL Thickness OU Analysis" or "ONH and RNFL OU Analysis"* *2.) For all other OCT analysis reports:* *<eye site>+ " " + <analysis name>* *where* *- <eye site> = "OD", "OS", or "OU"* *- <analysis name> = "Advanced Visualization" , "Anterior Segment Analysis", "High Definition Images", "Macular Thickness Analysis", "Guided Progression Analysis", "Macular Change Analysis", "3D Visualization", "Single Eye Summary", "Ganglion Cell OU Analysis", "Advanced RPE Analysis"* *3.) For Image Review reports:* *<eye site>+ " " + <review name>* *where* *- <eye site> = "OD", "OS", or "OU"* *- <analysis name> = "Magnify", "Compare", "Grid", "MultiMode Navigator"*	ALWAYS	AUTO
(0040,A043)	2	SQ	Concept Name Code Sequence	A coded representation of the document title. Zero or one item may be present.	EMPTY	AUTO

				Always zero items		
(0042,0012)	1	LO	MIME Type of Encapsulated Document	The type of the encapsulated document stream described using the MIME Media Type (see RFC 2046). *Always "application/pdf"*	ALWAYS	AUTO
(0042,0011)	1	OB	Encapsulated Document	Encapsulated Document stream, containing a document encoded according to the MIME Type.	ALWAYS	AUTO

Table 8-8 Encapsulated PDF IOD - Module "SOP Common"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0016)	1	UI	SOP Class UID	Uniquely identifies the SOP Class. See C.12.1.1.1 for further explanation. See also PS 3.4. *"1.2.840.10008.5.1.4.1.1.104.1"*	ALWAYS	AUTO
(0008,0018)	1	UI	SOP Instance UID	Uniquely identifies the SOP Instance. See C.12.1.1.1 for further explanation. See also PS 3.4. *"1.2.276.0.75.2.1.51.2." constant prefix for generated UIDs*	ALWAYS	AUTO
(0008,0005)	1C	CS	Specific Character Set	Character Set that expands or replaces the Basic Graphic Set. Required if an expanded or replacement character set is used. See C.12.1.1.2 for Defined Terms. *Always "ISO_IR 192" for UTF-8 encoded Unicode*	ALWAYS	AUTO
(0008,0012)	3	DA	Instance Creation Date	Date the SOP Instance was created.	ALWAYS	AUTO
(0008,0013)	3	TM	Instance Creation Time	Time the SOP Instance was created.	ALWAYS	AUTO

8.1.1.2 Ophthalmic Photography 8 Bit Information Object Definition

IE	Module	Usage
Patient		
	Patient	ALWAYS
Study		
	General Study	ALWAYS
Series		
	General Series	ALWAYS
	Ophthalmic Photography Series	ALWAYS
Frame Of Reference		
	Synchronization	ALWAYS
Equipment		
	General Equipment	ALWAYS
Image		
	General Image	ALWAYS
	Image Pixel	ALWAYS
	Enhanced Contrast Bolus	CONDITIONAL
	Cine	CONDITIONAL
	Multi Frame	ALWAYS
	Acquisition Context	ALWAYS
	Ophthalmic Photography Image	ALWAYS
	Ocular Region Imaged	ALWAYS
	Ophthalmic Photography Acquisition Parameters	ALWAYS
	Ophthalmic Photographic Parameters	ALWAYS
	SOP Common	ALWAYS
	Frame Extraction	CONDITIONAL
	Czm Ophthalmic Photography Image Extension	CONDITIONAL

Table 8-9 Ophthalmic Photography IOD - Module "Patient"

Tag	Type	VR	Name	Description	PoV	Source
(0010,0010)	2	PN	Patient's Name	Patient's full name.	ALWAYS	MWL, SRQ, USER
(0010,0020)	2	LO	Patient ID	Primary hospital identification number or code for the patient.	ALWAYS	MWL, SRQ, USER
(0010,0021)	3	LO	Issuer of Patient ID	Identifier of the Assigning Authority that issued the Patient ID.	ANAP	MWL, SRQ, AUTO
(0010,0030)	2	DA	Patient's Birth Date	Birth date of the patient.	ALWAYS	MWL, SRQ, USER

(0010,0040)	2	CS	Patient's Sex	Sex of the named patient. Enumerated Values: M = male F = female O = other	ALWAYS	MWL, SRQ, USER
(0010,1000)	3	LO	Other Patient IDs	Other identification numbers or codes used to identify the patient.	ANAP	MWL, SRQ
(0010,2160)	3	SH	Ethnic Group	Ethnic group or race of the patient.	ANAP	SRQ
(0010,4000)	3	LT	Patient Comments	User-defined additional information about the patient.	ANAP	MWL, SRQ, USER

Table 8-10 Ophthalmic Photography IOD - Module "General Study"

Tag	Type	VR	Name	Description	PoV	Source
(0020,000D)	1	UI	Study Instance UID	Unique identifier for the Study	ALWAYS	MWL, SRQ, AUTO
(0008,0020)	2	DA	Study Date	Date the Study started. Date, when procedure step was started.	ALWAYS	AUTO
(0008,0030)	2	TM	Study Time	Time the Study started. Time, when procedure step was started.	ALWAYS	AUTO
(0008,0090)	2	PN	Referring Physician's Name	Name of the patient's referring physician.	VNAP	MWL
(0020,0010)	2	SH	Study ID	User or equipment generated Study identifier. *In scheduled case the source attribute for this value is Requested Procedure ID* *In unscheduled case the value is an Equipment generated Study identifier*	ALWAYS	MWL, SRQ, AUTO
(0008,0050)	2	SH	Accession Number	A RIS generated number that identifies the order for the Study. *Value does not exist in unscheduled case.*	VNAP	MWL
(0008,1030)	3	LO	Study Description	Institution-generated description or classification of the Study (component) performed.	VNAP	MWL, SRQ
(0008,1110)	3	SQ	Referenced Study Sequence	A sequence that provides reference to a Study SOP Class/Instance pair. The sequence may have zero or more Items.	ANAP	MWL
>(0008,1150)	1	UI	Referenced SOP Class UID	Uniquely identifies the referenced SOP Class.	ALWAYS	MWL
>(0008,1155)	1	UI	Referenced SOP Instance UID	Uniquely identifies the referenced SOP Instance.	ALWAYS	MWL
(0008,1032)	3	SQ	Procedure Code Sequence	A Sequence that conveys the type of procedure performed. One or more Items may be included in this Sequence.	ANAP	MWL
>(0008,0100)	1	SH	Code Value	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	MWL
>(0008,0102)	1	SH	Coding Scheme Designator	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	MWL

>(0008,0103)	1C	SH	Coding Scheme Version	Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. *See chapter "8.3 Coded Terminology and Templates"*	VNAP	MWL
>(0008,0104)	1	LO	Code Meaning	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	MWL

Table 8-11 Ophthalmic Photography IOD - Module "General Series"

Tag	Type	VR	Name	Description	PoV	Source
(0020,000E)	1	UI	Series Instance UID	Unique identifier of the Series. *"1.2.276.0.75.2.1.51.2.2" extended by machine identifier and time information*	ALWAYS	AUTO
(0020,0011)	2	IS	Series Number	A number that identifies this Series.	ALWAYS	AUTO
(0020,0060)	2C	CS	Laterality	Laterality of (paired) body part examined. Required if the body part examined is a paired structure and Image Laterality (0020,0062) or Frame Laterality (0020,9072) are not sent. Enumerated Values: R = right L = left Note: Some IODs support Image Laterality (0020,0062) at the Image level or Frame Laterality(0020,9072) at the Frame level in the Frame Anatomy functional group macro, which can provide a more comprehensive mechanism for specifying the laterality of the body part(s) being examined.	ALWAYS	ACQUISITION, ANALYSIS
(0008,0021)	3	DA	Series Date	Date the Series started.	ALWAYS	AUTO
(0008,0031)	3	TM	Series Time	Time the Series started.	ALWAYS	AUTO
(0018,1030)	3	LO	Protocol Name	User-defined description of the conditions under which the Series was performed. Note: This attribute conveys series-specific protocol identification and may or may not be identical to the one presented in the Performed Protocol Code Sequence (0040,0260). *In scheduled case: Same value as for Requested Procedure Description (0032,1060).* *In unscheduled case: Always "FundusImage"*	ANAP	MWL, AUTO
(0008,1070)	3	PN	Operators' Name	Name(s) of the operator(s) supporting the Series.	ANAP	CONFIG
(0018,0015)	3	CS	Body Part Examined	Text description of the part of the body examined. See PS 3.16 Annexes on Correspondence of Anatomic Region Codes and Body Part Examined for Humans and for Animals for Defined Terms Note: Some IODs support the Anatomic Region Sequence (0008,2218), which can provide a more comprehensive mechanism for specifying the body	ALWAYS	AUTO

				part being examined. Always "HEAD"		
(0040,0275)	3	SQ	Request Attributes Sequence	Sequence that contains attributes from the Imaging Service Request. The sequence may have one or more Items. *The Request Attributes Sequence is only included in Scheduled Case. In unscheduled case it will not be included.*	ANAP	MWL
>(0040,1001)	1C	SH	Requested Procedure ID	Identifier that identifies the Requested Procedure in the Imaging Service Request. Required if procedure was scheduled. May be present otherwise. Note: The condition is to allow the contents of this macro to be present (e.g., to convey the reason for the procedure, such as whether a mammogram is for screening or diagnostic purposes) even when the procedure was not formally scheduled and a value for this identifier is unknown, rather than making up a dummy value.	ALWAYS	MWL
>(0032,1060)	3	LO	Requested Procedure Description	Institution-generated administrative description or classification of Requested Procedure.	VNAP	MWL
>(0040,0009)	1C	SH	Scheduled Procedure Step ID	Identifier that identifies the Scheduled Procedure Step. Required if procedure was scheduled. Note: The condition is to allow the contents of this macro to be present (e.g., to convey the reason for the procedure, such as whether a mammogram is for screening or diagnostic purposes) even when the procedure step was not formally scheduled and a value for this identifier is unknown, rather than making up a dummy value.	ALWAYS	MWL
>(0040,0007)	3	LO	Scheduled Procedure Step Description	Institution-generated description or classification of the Scheduled Procedure Step to be performed.	VNAP	MWL
>(0040,0008)	3	SQ	Scheduled Protocol Code Sequence	Sequence describing the Scheduled Protocol following a specific coding scheme. This sequence contains one or more Items.	ANAP	MWL
>>(0008,0100)	1	SH	Code Value	See NEMA PS3.3 Section 8.1.	ALWAYS	MWL
>>(0008,0102)	1	SH	Coding Scheme Designator	See NEMA PS3.3 Section 8.2.	ALWAYS	MWL
>>(0008,0103)	1C	SH	Coding Scheme Version	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise.	VNAP	MWL
>>(0008,0104)	1	LO	Code Meaning	See NEMA PS3.3 Section 8.3.	ALWAYS	MWL
(0040,0253)	3	SH	Performed Procedure Step	User or equipment generated identifier of that part of a Procedure that has	ALWAYS	AUTO

			ID	been carried out within this step.		
(0040,0244)	3	DA	Performed Procedure Step Start Date	Date on which the Performed Procedure Step started.	ALWAYS	AUTO
(0040,0245)	3	TM	Performed Procedure Step Start Time	Time on which the Performed Procedure Step started.	ALWAYS	AUTO
(0040,0254)	3	LO	Performed Procedure Step Description	Institution-generated description or classification of the Procedure Step that was performed. *In unscheduled case the attribute value = "FundusImage".* *In scheduled case the attribute has the same value as for Requested Procedure Description (0032,1060)*	ALWAYS	AUTO

Table 8-12 Ophthalmic Photography IOD - Module "Ophthalmic Photography Series"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0060)	1	CS	Modality	Source equipment that produced the Ophthalmic Photography Series. Enumerated Value: OP Always "OP"	ALWAYS	AUTO

Table 8-13 Ophthalmic Photography IOD - Module "Synchronization"

Tag	Type	VR	Name	Description	PoV	Source
(0020,0200)	1	UI	Synchronization Frame of Reference UID	UID of common synchronization environment. See C.7.4.2.1.1.	ALWAYS	AUTO
(0018,106A)	1	CS	Synchronization Trigger	Data acquisition synchronization with external equipment Enumerated Values: SOURCE - this equipment provides synchronization channel or trigger to other equipment EXTERNAL - this equipment receives synchronization channel or trigger from other equipment PASSTHRU - this equipment receives synchronization channel or trigger and forwards it NO TRIGGER - data acquisition not synchronized by common channel or trigger Always "NO TRIGGER"	ALWAYS	AUTO
(0018,1800)	1	CS	Acquisition Time Synchronized	Acquisition DateTime (0008,002A) synchronized with external time reference. Enumerated Values: Y, N See C.7.4.2.1.4 Always "N"	ALWAYS	AUTO

Table 8-14 Ophthalmic Photography IOD - Module "General Equipment"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0070)	2	LO	Manufacturer	Manufacturer of the equipment that produced the composite instances *"Carl Zeiss Meditec"*	ALWAYS	AUTO
(0008,0080)	3	LO	Institution Name	Institution where the equipment that produced the composite instances is located.	VNAP	CONFIG
(0008,0081)	3	ST	Institution Address	Mailing address of the institution where the equipment that produced the composite instances is located.	ANAP	CONFIG

(0008,1010)	3	SH	Station Name	User defined name identifying the machine that produced the composite instances.	VNAP	CONFIG
(0008,1040)	3	LO	Institutional Department Name	Department in the institution where the equipment that produced the composite instances is located.	ANAP	CONFIG
(0008,1090)	3	LO	Manufacturer's Model Name	Manufacturer's model name of the equipment that produced the composite instances. *"CIRRUS photo 600" or* *"CIRRUS photo 800"*	ALWAYS	AUTO
(0018,1000)	3	LO	Device Serial Number	Manufacturer's serial number of the equipment that produced the composite instances. Note: This identifier corresponds to the device that actually created the images, such as a CR plate reader or a CT console, and may not be sufficient to identify all of the equipment in the imaging chain, such as the generator or gantry or plate.	ALWAYS	AUTO
(0018,1020)	3	LO	Software Version(s)	Manufacturer's designation of software version of the equipment that produced the composite instances. "2.0.0.38309" and higher versions "2.0.x.y" where x denotes a patch version and y denotes a build version	ALWAYS	AUTO

Table 8-15 Ophthalmic Photography IOD - Module "General Image"

Tag	Type	VR	Name	Description	PoV	Source
(0020,0020)	2C	CS	Patient Orientation	Patient direction of the rows and columns of the image. Required if image does not require Image Orientation (Patient) (0020,0037) and Image Position (Patient) (0020,0032). May be present otherwise. See C.7.6.1.1.1 for further explanation. Note: IOD's may have attributes other than Patient Orientation, Image Orientation, or Image Position (Patient) to describe orientation in which case this attribute will be zero length. Always "L\F"	ALWAYS	AUTO
(0008,0022)	3	DA	Acquisition Date	The date the acquisition of data that resulted in this image started	ALWAYS	AUTO
(0008,0032)	3	TM	Acquisition Time	The time the acquisition of data that resulted in this image started	ALWAYS	AUTO
(0008,9215)	3	SQ	Derivation Code Sequence	A coded description of how this image was derived. See C.7.6.1.1.3 for further explanation. One or more Items may be included in this Sequence. More than one Item indicates that successive derivation steps have been applied. See chapter "8.3 Coded Terminology and Templates"	ANAP	AUTO
>(0008,0100)	1	SH	Code Value	See chapter "8.3 Coded Terminology and Templates"	ALWAYS	AUTO
>(0008,0102)	1	SH	Coding Scheme Designator	See chapter "8.3 Coded Terminology and Templates"	ALWAYS	AUTO
>(0008,0103)	1C	SH	Coding Scheme	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not	ALWAYS	AUTO

			Version	sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise. See chapter "8.3 Coded Terminology and Templates"		
>(0008,0104)	1	LO	Code Meaning	See chapter "8.3 Coded Terminology and Templates"	ALWAYS	AUTO
(0008,114A)	3	SQ	Referenced Instance Sequence	Non-image composite SOP Instances that are significantly related to this Image, including waveforms that may or may not be temporally synchronized with this image. One or more Items may be included in this sequence. *Included for referenced instances which are* *- simultaneously acquired* *- source images for image processing operation* *- source images for montage*	ANAP	AUTO
>(0008,1150)	1	UI	Referenced SOP Class UID	Uniquely identifies the referenced SOP Class.	ALWAYS	AUTO
>(0008,1155)	1	UI	Referenced SOP Instance UID	Uniquely identifies the referenced SOP Instance.	ALWAYS	AUTO
>(0040,A170)	1	SQ	Purpose of Reference Code Sequence	Code describing the purpose of the reference to the Instance(s). Only a single Item shall be permitted in this sequence.	ALWAYS	AUTO
>>(0008,0100)	1	SH	Code Value	See NEMA PS3.3 Section 8.1. *"121329" for sources of image montage* *"121322" for sources of image processing* *"122400" for instances simultaneously acquired*	ALWAYS	AUTO
>>(0008,0102)	1	SH	Coding Scheme Designator	See NEMA PS3.3 Section 8.2. *Always "DCM"*	ALWAYS	AUTO
>>(0008,0103)	1C	SH	Coding Scheme Version	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise.	ALWAYS	AUTO
>>(0008,0104)	1	LO	Code Meaning	See NEMA PS3.3 Section 8.3. *"Source image for montage", "Source image for image processing operation", "Simultaneously Acquired"*	ALWAYS	AUTO
(0020,4000)	3	LT	Image Comments	User-defined comments about the image	ANAP	USER

Table 8-16 Ophthalmic Photography IOD - Module "Image Pixel"

Tag	Type	VR	Name	Description	PoV	Source
(0028,0010)	1	US	Rows	Number of rows in the image.	ALWAYS	AUTO
(0028,0011)	1	US	Columns	Number of columns in the image	ALWAYS	AUTO
(0028,0100)	1	US	Bits Allocated	Number of bits allocated for each pixel sample. Each sample shall have the same number of bits allocated. See PS 3.5 for further explanation. *Always "8"*	ALWAYS	AUTO

(0028,0101)	1	US	Bits Stored	Number of bits stored for each pixel sample. Each sample shall have the same number of bits stored. See PS 3.5 for further explanation. *Always "8"*	ALWAYS	AUTO
(0028,0102)	1	US	High Bit	Most significant bit for pixel sample data. Each sample shall have the same high bit. See PS 3.5 for further explanation. *Always "7"*	ALWAYS	AUTO
(7FE0,0010)	1C	OB|OW	Pixel Data	A data stream of the pixel samples that comprise the Image. See C.7.6.3.1.4 for further explanation. Required if Pixel Data Provider URL (0028,7FE0) is not present.	ALWAYS	ACQUISITION, ANALYSIS

Table 8-17 Ophthalmic Photography IOD - Module "Enhanced Contrast Bolus"

Tag	Type	VR	Name	Description	PoV	Source
(0018,0012)	1	SQ	Contrast/Bolus Agent Sequence	Sequence that identifies one or more contrast agents administered prior to or during the acquisition. Shall contain one or more Items. *Included for angiographic images (capture modes FA and ICGA)*	ANAP	AUTO
>(0008,0100)	1	SH	Code Value	See NEMA PS3.3 Section 8.1. *"C-B02CC" for FA images* *"C-B0156" for ICGA images*	ALWAYS	AUTO
>(0008,0102)	1	SH	Coding Scheme Designator	See NEMA PS3.3 Section 8.2. *Always "SRT"*	ALWAYS	AUTO
>(0008,0103)	1C	SH	Coding Scheme Version	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise. *Always "20040921"*	ALWAYS	AUTO
>(0008,0104)	1	LO	Code Meaning	See NEMA PS3.3 Section 8.3. *For FA images: "Fluorescein"* *For ICGA images: "Indocyanine green"*	ALWAYS	AUTO
>(0018,9337)	1	US	Contrast/Bolus Agent Number	Identifying number, unique within this SOP Instance, of the agent administered. Used to reference this particular agent from the Contrast/Bolus Functional Group Macro. The number shall be 1 for the first Item and increase by 1 for each subsequent Item.	ALWAYS	AUTO
>(0018,0014)	1	SQ	Contrast/Bolus Administration Route Sequence	Sequence that identifies the route of administration of contrast agent. Shall contain exactly one Item.	ALWAYS	AUTO
>>(0008,0100)	1	SH	Code Value	See NEMA PS3.3 Section 8.1. *Always "G-D101"*	ALWAYS	AUTO
>>(0008,0102)	1	SH	Coding Scheme Designator	See NEMA PS3.3 Section 8.2. *Always "SRT"*	ALWAYS	AUTO
>>(0008,0103)	1C	SH	Coding Scheme Version	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the	ALWAYS	AUTO

				Code Value (0008,0100) unambiguously. May be present otherwise. *Always "20020904"*		
>>(0008,0104)	1	LO	Code Meaning	See NEMA PS3.3 Section 8.3. *Always "Intravenous route"*	ALWAYS	AUTO
>(0018,9338)	2	SQ	Contrast/Bolus Ingredient Code Sequence	Active ingredient of agent. Zero or more Items may be included in the Sequence. *Always zero items*	EMPTY	AUTO
>(0018,1041)	2	DS	Contrast/Bolus Volume	Total volume administered in milliliters of diluted contrast agent.	EMPTY	AUTO
>(0018,1049)	2	DS	Contrast/Bolus Ingredient Concentration	Milligrams of active ingredient per milliliter of agent.	EMPTY	AUTO
>(0018,9340)	3	SQ	Contrast Administration Profile Sequence	Sequence that describes one or more phases of contrast administered. If present, shall contain one or more Items.	ALWAYS	AUTO
>>(0018,1041)	2	DS	Contrast/Bolus Volume	Volume administered during this phase in milliliters of diluted contrast agent.	EMPTY	AUTO
>>(0018,1042)	3	TM	Contrast/Bolus Start Time	Time of start of administration.	ALWAYS	USER, AUTO

Table 8-18 Ophthalmic Photography IOD - Module "Cine"

Tag	Type	VR	Name	Description	PoV	Source
(0018,1063)	1C	DS	Frame Time	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 "0"*	ALWAYS	AUTO

Table 8-19 Ophthalmic Photography IOD - Module "Multiframe"

Tag	Type	VR	Name	Description	PoV	Source
(0028,0008)	1	IS	Number of Frames	Number of frames in a Multi-frame Image. See C.7.6.6.1.1 for further explanation. *Always "1"*	ALWAYS	AUTO
(0028,0009)	1	AT	Frame Increment Pointer	Contains the Data Element Tag of the attribute that is used as the frame increment in Multi-frame pixel data. See C.7.6.6.1.1 for further explanation. *Always "00000018\00001063" for Frame Time*	ALWAYS	AUTO

Table 8-20 Ophthalmic Photography IOD - Module "Acquisition Context"

Tag	Type	VR	Name	Description	PoV	Source
(0040,0555)	2	SQ	Acquisition Context Sequence	A sequence of Items that describes the conditions present during the acquisition of the data of the SOP Instance. Zero or more items may be included in this sequence. *See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
>(0040,A043)	1	SQ	Concept Name Code Sequence	A concept that constrains the meaning of (i.e. defines the role of) the Observation Value. The "Name" component of a Name/Value pair. This	ALWAYS	AUTO

				sequence shall contain exactly one item.		
>>(0008,0100)	1	SH	Code Value	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
>>(0008,0102)	1	SH	Coding Scheme Designator	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
>>(0008,0103)	1C	SH	Coding Scheme Version	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise. *See chapter "8.3 Coded Terminology and Templates"*	ANAP	AUTO
>>(0008,0104)	1	LO	Code Meaning	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
>(0040,A30A)	1C	DS	Numeric Value	This is the Value component of a Name/Value pair when the Concept implied by Concept Name Code Sequence (0040,A043) is a set of one or more numeric values. Required if the value that Concept Name Code Sequence (0040,A043) requires (implies) is a set of one or more integers or real numbers. Shall not be present otherwise.	ANAP	ACQUISITION, USER, AUTO
>(0040,08EA)	1C	SQ	Measurement Units Code Sequence	Units of measurement. Only a single Item shall be permitted in this Sequence. Required if Numeric Value (0040,A30A) is sent. Shall not be present otherwise.	ANAP	AUTO
>>(0008,0100)	1	SH	Code Value	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
>>(0008,0102)	1	SH	Coding Scheme Designator	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
>>(0008,0103)	1C	SH	Coding Scheme Version	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise. *See chapter "8.3 Coded Terminology and Templates"*	ANAP	AUTO
>>(0008,0104)	1	LO	Code Meaning	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
>(0040,A168)	1C	SQ	Concept Code Sequence	This is the Value component of a Name/Value pair when the Concept implied by Concept Name Code Sequence (0040,A043) is a Coded Value. This sequence shall contain exactly one item. Required if Date (0040,A121), Time (0040,A122), Person Name (0040,A123), Text Value (0040,A160), and the pair of Numeric Value (0040,A30A) and Measurement Units Code Sequence (0040,08EA) are	ANAP	AUTO

				not present.		
>>(0008,0100)	1	SH	Code Value	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
>>(0008,0102)	1	SH	Coding Scheme Designator	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
>>(0008,0103)	1C	SH	Coding Scheme Version	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise. *See chapter "8.3 Coded Terminology and Templates"*	ANAP	AUTO
>>(0008,0104)	1	LO	Code Meaning	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO

Table 8-21 Ophthalmic Photography IOD - Module "Ophthalmic Photography Image"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0008)	1	CS	Image Type	Image identification characteristics. See C.8.17.2.1.4 for specialization. *Multi-value attribute containing 4 values:* *1) Pixel Data Characteristics* • *"ORIGINAL" for original acquired images* • *"DERIVED" for any derived image* *2) Patient Examination Characteristics* • *always "PRIMARY"* *3) Modality Specific Characteristics* • *"MONTAGE" for panorama images* • *empty otherwise* *4) Implementation specific identifiers* • *"COLOR", "REDFREE", "RED", "BLUE", "FA", "AF" or "ICG" according to selected capture mode*	ALWAYS	AUTO
(0020,0013)	1	IS	Instance Number	A number that identifies this image.	ALWAYS	AUTO
(0028,0002)	1	US	Samples per Pixel	Number of samples (planes) in this image. Enumerated values: 1 or 3. See C.8.17.2.1.2 for further explanation. *"1" for greyscale images* *"3" for color images*	ALWAYS	AUTO
(0028,0004)	1	CS	Photometric Interpretation	Specifies the intended interpretation of the pixel data. See NEMA PS3.3 Section C.8.17.2.1.3 *"MONOCHROME2" for greyscale images* *"YBR_FULL_422" for color images*	ALWAYS	AUTO
(0028,0103)	1	US	Pixel Representation	Data representation of the pixel samples. Each sample shall have the same pixel representation. Enumerated Values:0000 = unsigned integer.0001 = 2's complement *Always "0"*	ALWAYS	AUTO
(0028,0006)	1C	US	Planar	Indicates whether the pixel data are sent color-by-plane or color-by-pixel. Required if	ALWAYS	AUTO

			Configuration	Samples per Pixel (0028,0002) has a value greater than 1. Enumerated value shall be 0 (color-by-pixel). *Always "0"*		
(0028,0030)	1C	DS	Pixel Spacing	Nominal physical distance at the focal plane (in the retina) between the center of each pixel, specified by a numeric pair - adjacent row spacing (delimiter) adjacent column spacing in mm. See 10.7.1.3 for further explanation of the value order. Note: These values are specified as nominal because the physical distance may vary across the field of the images and the lens correction is likely to be imperfect. Required when Acquisition Device Type Code Sequence (0022,0015) contains an item with the value (SRT, R-1021A,"Fundus Camera"). May be present otherwise. *Multi-value attribute containing 2 values:* *1) adjacent row spacing in mm* *2) adjacent column spacing in mm*	ALWAYS	AUTO
(0008,0033)	1	TM	Content Time	The time the image pixel data creation started.	ALWAYS	AUTO
(0008,0023)	1	DA	Content Date	The date the image pixel data creation started.	ALWAYS	AUTO
(0008,002A)	1C	DT	Acquisition Datetime	The date and time that the acquisition of data started. Note: The synchronization of this time with an external clock is specified in the synchronization Module in Acquisition Time Synchronized (0018,1800). Required if Image Type (0008,0008) Value 1 is ORIGINAL. May be present otherwise.	ALWAYS	AUTO
(0008,2112)	2C	SQ	Source Image Sequence	A Sequence that identifies the Images that were used to derive this Image. Required if Image Type Value 1 is DERIVED. Zero or more items may be present in the sequence. See C.7.6.1.1.4 for further explanation. *Included for derived images which are result images of* *- a montage from source images* *- a image processing operation*	ANAP	AUTO
>(0008,1150)	1	UI	Referenced SOP Class UID	Uniquely identifies the referenced SOP Class.	ALWAYS	AUTO
>(0008,1155)	1	UI	Referenced SOP Instance UID	Uniquely identifies the referenced SOP Instance.	ALWAYS	AUTO
>(0040,A170)	1	SQ	Purpose of Reference Code Sequence	Describes the purpose for which the reference is made, that is what role the source image or frame(s) played in the derivation of this image. Only a single Item shall be permitted in this sequence.	ALWAYS	AUTO
>>(0008,0100)	1	SH	Code Value	See NEMA PS3.3 Section 8.1. *"121329" for sources of image montage* *"121322" for sources of image processing*	ALWAYS	AUTO
>>(0008,0102)	1	SH	Coding Scheme Designator	See NEMA PS3.3 Section 8.2. *Always "DCM"*	ALWAYS	AUTO

>>(0008,0103)	1C	SH	Coding Scheme Version	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise. *Always "20051101"*	ALWAYS	AUTO
>>(0008,0104)	1	LO	Code Meaning	See NEMA PS3.3 Section 8.3. *"Source image for montage" or* *"Source image for image processing operation"*	ALWAYS	AUTO
(0028,2110)	1	CS	Lossy Image Compression	Specifies whether an Image has undergone lossy compression. Enumerated Values: 00 = Image has NOT been subjected to lossy compression. 01 = Image has been subjected to lossy compression. See C.7.6.1.1.5 *"01" if image is compressed* *"00" otherwise*	ALWAYS	AUTO
(0028,2112)	1C	DS	Lossy Image Compression Ratio	Describes the approximate lossy compression ratio(s) that have been applied to this image. See C.7.6.1.1.5 for further explanation. May be multivalued if successive lossy compression steps have been applied. Notes: 1. For example, a compression ratio of 30:1 would be described in this Attribute with a single value of 30. 2. For historical reasons, the lossy compression ratio should also be described in Derivation Description (0008,2111) Required if Lossy Image Compression (0028,2110) has a value of "01".	ANAP	AUTO
(0028,2114)	1C	CS	Lossy Image Compression Method	A label for the lossy compression method(s) that have been applied to this image. See C.7.6.1.1.5 for further explanation. May be multivalued if successive lossy compression steps have been applied; the value order shall correspond to the values of Lossy Image Compression Ratio (0028,2112). Required if Lossy Image Compression (0028,2110) has a value of "01". Note: For historical reasons, the lossy compression method should also be described in Derivation Description (0008,2111). *"ISO_10918_1" if image is compressed*	ANAP	AUTO
(2050,0020)	1C	CS	Presentation LUT Shape	Specifies an identity transformation for the Presentation LUT, such that the output of all grayscale transformations defined in the IOD containing this Module are defined to be P-Values. Enumerated Values: IDENTITY - output is in P-Values. Required if Photometric Interpretation (0028,0004) is MONOCHROME2 *"IDENTITY" for grayscale images*	ANAP	AUTO
(0028,0301)	1	CS	Burned In Annotation	Indicates whether or not image contains sufficient burned in annotation to identify the patient and date the image was acquired. Enumerated Value: YES NO *"YES" if any identification info is burned in* *"NO" otherwise*	ALWAYS	CONFIG

Table 8-22 Ophthalmic Photography IOD - Module "Ocular Region Imaged"

Tag	Type	VR	Name	Description	PoV	Source
(0020,0062)	1	CS	Image Laterality	Laterality of object imaged (as described in Anatomic Region Sequence (0008,2218)) examined. Enumerated Values: R = right eye L = left eye B = both left and right eye Shall be consistent with any laterality information contained in Primary Anatomic Structure Modifier Sequence (0008,2230), if present. Note: Laterality (0020,0060) is a Series level Attribute and must be the same for all Images in the Series. Since most Ophthalmic Photographic Image studies contain images of both eyes, the series level attribute will rarely be present.	ALWAYS	AUTO
(0008,2218)	1	SQ	Anatomic Region Sequence	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 permitted in this sequence.	ALWAYS	AUTO
>(0008,0100)	1	SH	Code Value	See NEMA PS3.3 Section 8.1. *Always "T-AA000"*	ALWAYS	AUTO
>(0008,0102)	1	SH	Coding Scheme Designator	See NEMA PS3.3 Section 8.2. *Always "SRT"*	ALWAYS	AUTO
>(0008,0104)	1	LO	Code Meaning	See NEMA PS3.3 Section 8.3. *Always "Eye"*	ALWAYS	AUTO

Table 8-23 Ophthalmic Photography IOD - Module "Ophthalmic Photography Acquisition Parameters"

Tag	Type	VR	Name	Description	PoV	Source
(0022,0005)	2	CS	Patient Eye Movement Commanded	Enumerated Values: YES NO	EMPTY	AUTO
(0022,001B)	2	SQ	Refractive State Sequence	The refractive state of the imaged eye at the time of acquisition. Zero or one Item shall be present. Zero length means the refractive state was not measured. *Always zero items*	EMPTY	AUTO
(0022,000A)	2	FL	Emmetropic Magnification	Emmetropic magnification value (dimensionless). Zero length means the emmetropic magnification was not measured.	EMPTY	AUTO
(0022,000B)	2	FL	Intra Ocular Pressure	Value of intraocular pressure in mmHg. Zero length means the pressure was not measured	EMPTY	AUTO
(0022,000D)	2	CS	Pupil Dilated	Enumerated Values: YES NO If this tag is empty, no information is available.	EMPTY	AUTO

Table 8-24 Ophthalmic Photography IOD - Module "Ophthalmic Photographic Parameters"

Tag	Type	VR	Name	Description	PoV	Source
(0022,0015)	1	SQ	Acquisition Device Type Code Sequence	Describes the type of acquisition device. A single item shall be present in the sequence.	ALWAYS	AUTO
>(0008,0100)	1	SH	Code Value	See NEMA PS3.3 Section 8.1. *Always "R-1021A"*	ALWAYS	AUTO

>(0008,0102)	1	SH	Coding Scheme Designator	See NEMA PS3.3 Section 8.2. *Always "SRT"*	ALWAYS	AUTO
>(0008,0104)	1	LO	Code Meaning	See NEMA PS3.3 Section 8.3. *Always "Fundus Camera"*	ALWAYS	AUTO
(0022,0016)	2	SQ	Illumination Type Code Sequence	Coded value for illumination. Zero or one item shall be present in the sequence. *Always zero items*	EMPTY	AUTO
(0022,0017)	2	SQ	Light Path Filter Type Stack Code Sequence	Filters used in the light source path. Zero or more items may be present in the sequence. *Always zero items*	EMPTY	AUTO
(0022,0018)	2	SQ	Image Path Filter Type Stack Code Sequence	Describes stack of filters used in image path. Zero or more items may be present in the sequence. *Always zero items*	EMPTY	AUTO
(0022,0019)	2	SQ	Lenses Code Sequence	Lenses that were used during the image acquisition. Zero or more items may be present in the sequence. *Always zero items*	EMPTY	AUTO
(0018,7004)	2	CS	Detector Type	Type of detector used for creating this image. Defined terms: CCD = Charge Coupled Devices CMOS = Complementary Metal Oxide Semiconductor *"CCD" if image is acquired with CIRRUS photo* *Empty otherwise*	VNAP	AUTO

Table 8-25 Ophthalmic Photography IOD - Module "SOP Common"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0016)	1	UI	SOP Class UID	Uniquely identifies the SOP Class. See C.12.1.1.1 for further explanation. See also PS 3.4. *"1.2.840.10008.5.1.4.1.1.77.1.5.1"*	ALWAYS	AUTO
(0008,0018)	1	UI	SOP Instance UID	Uniquely identifies the SOP Instance. See C.12.1.1.1 for further explanation. See also PS 3.4. *"1.2.276.0.75.2.1.51.2." constant prefix for generated UIDs*	ALWAYS	AUTO
(0008,0005)	1C	CS	Specific Character Set	Character Set that expands or replaces the Basic Graphic Set. Required if an expanded or replacement character set is used. See C.12.1.1.2 for Defined Terms. *Always "ISO_IR 192" for UTF-8 encoded Unicode*	ALWAYS	AUTO
(0008,0012)	3	DA	Instance Creation Date	Date the SOP Instance was created.	ALWAYS	AUTO
(0008,0013)	3	TM	Instance Creation Time	Time the SOP Instance was created.	ALWAYS	AUTO

Table 8-26 Ophthalmic Photography IOD - Module "Czm Ophthalmic Photography Image Extension"

Tag	Type	VR	Name	Description	PoV	Source
(0022,000C)	3	FL	Horizontal Field of View	Horizontal field of view in degrees of the Fundus Camera. *Attribute not present for derived montage*	ANAP	ACQUISITION

				images and imported images		

8.1.1.3 Multi-frame True Color Secondary Capture Information Object Defintion

IE	Module	Usage
Patient		
	Patient	ALWAYS
Study		
	General Study	ALWAYS
Series		
	General Series	ALWAYS
Equipment		
	General Equipment	ALWAYS
	SC Equipment	ALWAYS
Image		
	General Image	ALWAYS
	Image Pixel	ALWAYS
	Multi Frame Functional Groups	ALWAYS
	SC Multi Frame Image	ALWAYS
	SOP Common	ALWAYS

Table 8-27 Multi-frame True Color Secondary Capture IOD - Module "Patient"

Tag	Type	VR	Name	Description	PoV	Source
(0010,0010)	2	PN	Patient's Name	Patient's full name.	ALWAYS	MWL, SRQ, USER
(0010,0020)	2	LO	Patient ID	Primary hospital identification number or code for the patient.	ALWAYS	MWL, SRQ, USER
(0010,0021)	3	LO	Issuer of Patient ID	Identifier of the Assigning Authority that issued the Patient ID.	ANAP	MWL, SRQ, AUTO
(0010,0030)	2	DA	Patient's Birth Date	Birth date of the patient.	ALWAYS	MWL, SRQ, USER
(0010,0040)	2	CS	Patient's Sex	Sex of the named patient. Enumerated Values: M = male F = female O = other	ALWAYS	MWL, SRQ, USER
(0010,1000)	3	LO	Other Patient IDs	Other identification numbers or codes used to identify the patient.	ANAP	MWL, SRQ
(0010,2160)	3	SH	Ethnic Group	Ethnic group or race of the patient.	ANAP	SRQ
(0010,4000)	3	LT	Patient Comments	User-defined additional information about the patient.	ANAP	MWL, SRQ, USER

Table 8-28 Multi-frame True Color Secondary Capture IOD - Module "General Study"

Tag	Type	VR	Name	Description	PoV	Source
(0020,000D)	1	UI	Study Instance UID	Unique identifier for the Study	ALWAYS	MWL, SRQ, AUTO
(0008,0020)	2	DA	Study Date	Date the Study started. Date, when procedure step was started.	ALWAYS	AUTO

(0008,0030)	2	TM	Study Time	Time the Study started. Time, when procedure step was started.	ALWAYS	AUTO
(0008,0090)	2	PN	Referring Physician's Name	Name of the patient's referring physician.	VNAP	MWL
(0020,0010)	2	SH	Study ID	User or equipment generated Study identifier. *In scheduled case the source attribute for this value is Requested Procedure ID* *In unscheduled case the value is a Equipment generated Study identifier*	ALWAYS	MWL, SRQ, AUTO
(0008,0050)	2	SH	Accession Number	A RIS generated number that identifies the order for the Study. *Value does not exist in unscheduled case.*	VNAP	MWL
(0008,1030)	3	LO	Study Description	Institution-generated description or classification of the Study (component) performed.	VNAP	MWL, SRQ
(0008,1110)	3	SQ	Referenced Study Sequence	A sequence that provides reference to a Study SOP Class/Instance pair. The sequence may have zero or more Items.	ANAP	MWL
>(0008,1150)	1	UI	Referenced SOP Class UID	Uniquely identifies the referenced SOP Class.	ALWAYS	MWL
>(0008,1155)	1	UI	Referenced SOP Instance UID	Uniquely identifies the referenced SOP Instance.	ALWAYS	MWL
(0008,1032)	3	SQ	Procedure Code Sequence	A Sequence that conveys the type of procedure performed. One or more Items may be included in this Sequence.	ANAP	MWL
>(0008,0100)	1	SH	Code Value	See NEMA PS3.3 Section 8.1.	ALWAYS	MWL
>(0008,0102)	1	SH	Coding Scheme Designator	See NEMA PS3.3 Section 8.2.	ALWAYS	MWL
>(0008,0103)	1C	SH	Coding Scheme Version	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously.	VNAP	MWL
>(0008,0104)	1	LO	Code Meaning	See NEMA PS3.3 Section 8.3.	ALWAYS	MWL

Table 8-29 Multi-frame True Color Secondary Capture IOD - Module "General Series"

Tag	Type	VR	Name	Description	PoV	Source
(0020,000E)	1	UI	Series Instance UID	Unique identifier of the Series. *"1.2.276.0.75.2.1.51.2.2" extended by machine identifier and time information*	ALWAYS	AUTO
(0020,0011)	2	IS	Series Number	A number that identifies this Series.	ALWAYS	AUTO
(0020,0060)	2C	CS	Laterality	Laterality of (paired) body part examined. Required if the body part examined is a paired structure and Image Laterality (0020,0062) or Frame Laterality (0020,9072) are not sent. Enumerated Values: R = right L = left Note: Some IODs support Image Laterality (0020,0062) at the Image level or Frame	ALWAYS	AUTO

				Laterality(0020,9072) at the Frame level in the Frame Anatomy functional group macro, which can provide a more comprehensive mechanism for specifying the laterality of the body part(s) being examined.		
(0008,0021)	3	DA	Series Date	Date the Series started.	ALWAYS	AUTO
(0008,0031)	3	TM	Series Time	Time the Series started.	ALWAYS	AUTO
(0018,1030)	3	LO	Protocol Name	User-defined description of the conditions under which the Series was performed. Note: This attribute conveys series-specific protocol identification and may or may not be identical to the one presented in the Performed Protocol Code Sequence (0040,0260). *In scheduled case: Same value as for Requested Procedure Description (0032,1060).* *In unscheduled case: Always "CPImage"*	ANAP	MWL, AUTO
(0008,1070)	3	PN	Operators' Name	Name(s) of the operator(s) supporting the Series.	ANAP	CONFIG
(0018,0015)	3	CS	Body Part Examined	Text description of the part of the body examined. See PS 3.16 Annexes on Correspondence of Anatomic Region Codes and Body Part Examined for Humans and for Animals for Defined Terms Note: Some IODs support the Anatomic Region Sequence (0008,2218), which can provide a more comprehensive mechanism for specifying the body part being examined. *Always "HEAD"*	ALWAYS	AUTO
(0040,0275)	3	SQ	Request Attributes Sequence	Sequence that contains attributes from the Imaging Service Request. The sequence may have one or more Items. *The Request Attributes Sequence is only included in Scheduled Case. In unscheduled case it will not be included.*	ANAP	MWL
>(0040,1001)	1C	SH	Requested Procedure ID	Identifier that identifies the Requested Procedure in the Imaging Service Request. Required if procedure was scheduled. May be present otherwise. Note: The condition is to allow the contents of this macro to be present (e.g., to convey the reason for the procedure, such as whether a mammogram is for screening or diagnostic purposes) even when the procedure was not formally scheduled and a value for this identifier is unknown, rather than making up a dummy value.	ALWAYS	MWL
>(0032,1060)	3	LO	Requested Procedure Description	Institution-generated administrative description or classification of Requested Procedure.	VNAP	MWL
>(0040,0009)	1C	SH	Scheduled Procedure Step ID	Identifier that identifies the Scheduled Procedure Step. Required if procedure was scheduled. Note: The condition is to allow the contents of this macro to be present (e.g., to convey the reason for the procedure, such as whether a mammogram is for screening or diagnostic purposes) even when the procedure step was not formally scheduled and a value for this identifier is unknown, rather than making up a dummy value.	ALWAYS	MWL
>(0040,0007)	3	LO	Scheduled	Institution-generated description or classification	VNAP	MWL

			Procedure Step Description	of the Scheduled Procedure Step to be performed.		
>(0040,0008)	3	SQ	Scheduled Protocol Code Sequence	Sequence describing the Scheduled Protocol following a specific coding scheme. This sequence contains one or more Items.	ANAP	MWL
>>(0008,0100)	1	SH	Code Value	See NEMA PS3.3 Section 8.1.	ALWAYS	MWL
>>(0008,0102)	1	SH	Coding Scheme Designator	See NEMA PS3.3 Section 8.2.	ALWAYS	MWL
>>(0008,0103)	1C	SH	Coding Scheme Version	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise.	VNAP	MWL
>>(0008,0104)	1	LO	Code Meaning	See NEMA PS3.3 Section 8.3.	ALWAYS	MWL
(0040,0253)	3	SH	Performed Procedure Step ID	User or equipment generated identifier of that part of a Procedure that has been carried out within this step.	ALWAYS	AUTO
(0040,0244)	3	DA	Performed Procedure Step Start Date	Date on which the Performed Procedure Step started.	ALWAYS	AUTO
(0040,0245)	3	TM	Performed Procedure Step Start Time	Time on which the Performed Procedure Step started.	ALWAYS	AUTO
(0040,0254)	3	LO	Performed Procedure Step Description	Institution-generated description or classification of the Procedure Step that was performed. *In unscheduled case the attribute value = "CPImage".* *In scheduled case the attribute has the same value as for Requested Procedure Description (0032,1060)*	ALWAYS	AUTO

Table 8-30 Multi-frame True Color Secondary Capture IOD - Module "General Equipment"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0070)	2	LO	Manufacturer	Manufacturer of the equipment that produced the composite instances *"Carl Zeiss Meditec"*	ALWAYS	AUTO
(0008,0080)	3	LO	Institution Name	Institution where the equipment that produced the composite instances is located.	VNAP	CONFIG
(0008,0081)	3	ST	Institution Address	Mailing address of the institution where the equipment that produced the composite instances is located.	ANAP	CONFIG
(0008,1010)	3	SH	Station Name	User defined name identifying the machine that produced the composite instances.	VNAP	CONFIG
(0008,1040)	3	LO	Institutional Department Name	Department in the institution where the equipment that produced the composite instances is located.	ANAP	CONFIG

(0008,1090)	3	LO	Manufacturer's Model Name	Manufacturer's model name of the equipment that produced the composite instances. *"CIRRUS photo 600" or* *"CIRRUS photo 800"*	ALWAYS	AUTO
(0018,1000)	3	LO	Device Serial Number	Manufacturer's serial number of the equipment that produced the composite instances. Note: This identifier corresponds to the device that actually created the images, such as a CR plate reader or a CT console, and may not be sufficient to identify all of the equipment in the imaging chain, such as the generator or gantry or plate.	ALWAYS	AUTO
(0018,1020)	3	LO	Software Version(s)	Manufacturer's designation of software version of the equipment that produced the composite instances. "2.0.0.38309" and higher versions "2.0.x.y" where x denotes a patch version and y denotes a build version	ALWAYS	AUTO

Table 8-31 Multi-frame True Color Secondary Capture IOD - Module "SC Equipment"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0064)	1	CS	Conversion Type	Describes the kind of image conversion. Defined Terms : DV = Digitized Video DI = Digital Interface DF = Digitized Film WSD = Workstation SD = Scanned Document SI = Scanned Image DRW = Drawing SYN = Synthetic Image *Always "SYN" for Synthetic Image*	ALWAYS	AUTO
(0008,0060)	3	CS	Modality	Source equipment for the image. This type definition shall override the definition in the General Series Module. See C.7.3.1.1.1 for Defined Terms. *Always "OPT"*	ALWAYS	AUTO

Table 8-32 Multi-frame True Color Secondary Capture IOD - Module "General Image"

Tag	Type	VR	Name	Description	PoV	Source
(0020,0020)	2C	CS	Patient Orientation	Patient direction of the rows and columns of the image. Required if image does not require Image Orientation (Patient) (0020,0037) and Image Position (Patient) (0020,0032). May be present otherwise. See C.7.6.1.1.1 for further explanation. Note: IOD's may have attributes other than Patient Orientation, Image Orientation, or Image Position (Patient) to describe orientation in which case this attribute will be zero length. *Always "L\F"*	ALWAYS	AUTO
(0008,0008)	3	CS	Image Type	Image identification characteristics. See C.7.6.1.1.2 for Defined Terms and further explanation. *Multi-value attribute containing 4 values:* *1) Pixel Data Characteristics* • *always "DERIVED"* *2) Patient Examination Characteristics* • *always "PRIMARY"* *3) Modality Specific Characteristics* • *always empty*	ALWAYS	AUTO

				4) Implementation specific identifiers • *"ANTERIOR B SCAN" for anterior B-scan images* • *"POSTERIOR B SCAN" for posterior B-scan images* • *"OCT B SCAN" for any other B-scan images*		
(0008,0022)	3	DA	Acquisition Date	The date the acquisition of data that resulted in this image started	ALWAYS	AUTO
(0008,0032)	3	TM	Acquisition Time	The time the acquisition of data that resulted in this image started	ALWAYS	AUTO
(0008,002A)	3	DT	Acquisition Datetime	The date and time that the acquisition of data that resulted in this image started. Note: The synchronization of this time with an external clock is specified in the Synchronization Module in Acquisition Time Synchronized (0018,1800).	ALWAYS	AUTO
(0008,9215)	3	SQ	Derivation Code Sequence	A coded description of how this image was derived. See C.7.6.1.1.3 for further explanation. One or more Items may be included in this Sequence. More than one Item indicates that successive derivation steps have been applied. *See chapter "8.3 Coded Terminology and Templates"*	ANAP	AUTO
>(0008,0100)	1	SH	Code Value	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
>(0008,0102)	1	SH	Coding Scheme Designator	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
>(0008,0103)	1C	SH	Coding Scheme Version	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise. *See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
>(0008,0104)	1	LO	Code Meaning	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
(0008,114A)	3	SQ	Referenced Instance Sequence	Non-image composite SOP Instances that are significantly related to this Image, including waveforms that may or may not be temporally synchronized with this image. One or more Items may be included in this sequence. *Included for referenced instances which are* *- source instances for the secondary capture*	ALWAYS	AUTO
>(0008,1150)	1	UI	Referenced SOP Class UID	Uniquely identifies the referenced SOP Class. *Always "1.2.840.10008.5.1.4.1.1.66"*	ALWAYS	AUTO
>(0008,1155)	1	UI	Referenced SOP Instance UID	Uniquely identifies the referenced SOP Instance. *References the Instance_UID of the RAW acquisition data*	ALWAYS	AUTO
>(0040,A170)	1	SQ	Purpose of Reference Code Sequence	Code describing the purpose of the reference to the Instance(s). Only a single Item shall be permitted in this sequence.	ALWAYS	AUTO
>>(0008,0100)	1	SH	Code Value	See NEMA PS3.3 Section 8.1.	ALWAYS	AUTO

				Always "SRC_INSTANCE"		
>>(0008,0102)	1	SH	Coding Scheme Designator	See NEMA PS3.3 Section 8.2. *Always "99CZM"*	ALWAYS	AUTO
>>(0008,0103)	1C	SH	Coding Scheme Version	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise. *Always "20120401"*	ALWAYS	AUTO
>>(0008,0104)	1	LO	Code Meaning	See NEMA PS3.3 Section 8.3. *Always "Source instance used to create this instance"*	ALWAYS	AUTO
(0020,4000)	3	LT	Image Comments	User-defined comments about the image	ANAP	USER

Table 8-33 Multi-frame True Color Secondary Capture IOD - Module "Image Pixel"

Tag	Type	VR	Name	Description	PoV	Source
(0028,0002)	1	US	Samples per Pixel	Number of samples (planes) in this image. See C.7.6.3.1.1 for further explanation. *Always "3"*	ALWAYS	AUTO
(0028,0004)	1	CS	Photometric Interpretation	Specifies the intended interpretation of the pixel data. See C.7.6.3.1.2 for further explanation. *Always "YBR_FULL_422"*	ALWAYS	AUTO
(0028,0010)	1	US	Rows	Number of rows in the image.	ALWAYS	AUTO
(0028,0011)	1	US	Columns	Number of columns in the image	ALWAYS	AUTO
(0028,0100)	1	US	Bits Allocated	Number of bits allocated for each pixel sample. Each sample shall have the same number of bits allocated. See PS 3.5 for further explanation. *Always "8"*	ALWAYS	AUTO
(0028,0101)	1	US	Bits Stored	Number of bits stored for each pixel sample. Each sample shall have the same number of bits stored. See PS 3.5 for further explanation. *Always "8"*	ALWAYS	AUTO
(0028,0102)	1	US	High Bit	Most significant bit for pixel sample data. Each sample shall have the same high bit. See PS 3.5 for further explanation. *Always "7"*	ALWAYS	AUTO
(0028,0103)	1	US	Pixel Representation	Data representation of the pixel samples. Each sample shall have the same pixel representation. Enumerated Values:0000 = unsigned integer.0001 = 2's complement *Always "0"*	ALWAYS	AUTO
(7FE0,0010)	1C	OB|OW	Pixel Data	A data stream of the pixel samples that comprise the Image. See C.7.6.3.1.4 for further explanation. Required if Pixel Data Provider URL (0028,7FE0) is not present.	ALWAYS	AUTO
(0028,0006)	1C	US	Planar Configuration	Indicates whether the pixel data are sent color-by-plane or color-by-pixel. Required if Samples per Pixel (0028,0002) has a value	ALWAYS	AUTO

				greater than 1. See C.7.6.3.1.3 for further explanation. *Always "0"*		

Table 8-34 Multi-frame True Color Secondary Capture IOD - Module "Multi Frame Functional Groups"

Tag	Type	VR	Name	Description	PoV	Source
(5200,9229)	2	SQ	Shared Functional Groups Sequence	Sequence that contains the Functional Group Macros that are shared for all frames in this SOP Instance and Concatenation. Note: The contents of this sequence are the same in all SOP Instances that comprise a Concatenation. Zero or one Item may be included in this sequence. See NEMA PS3.3 Section C.7.6.16.1.1 for further explanation. *Always zero items*	EMPTY	AUTO
(5200,9230)	1	SQ	Per-frame Functional Groups Sequence	Sequence that contains the Functional Group Macros corresponding to each frame of the Multi-frame Image. The first Item corresponds with the first frame, and so on. Each Item shall contain the same set of Functional Group Macros. This Sequence shall contain the same number of Items as the number of frames in the Multi-frame image. See NEMA PS3.3 Section C.7.6.16.1.2 for further explanation. *Always with one empty item*	ALWAYS	AUTO
(0020,0013)	1	IS	Instance Number	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
(0008,0023)	1	DA	Content Date	The date the data creation was started. Note: For instance, this is the date the pixel data is created, not the date the data is acquired.	ALWAYS	AUTO
(0008,0033)	1	TM	Content Time	The time the data creation was started. Note: For instance, this is the time the pixel data is created, not the time the data is acquired.	ALWAYS	AUTO
(0028,0008)	1	IS	Number of Frames	Number of frames in a multi-frame image. See C.7.6.6.1.1 for further explanation. *Always "1"*	ALWAYS	AUTO

Table 8-35 Multi-frame True Color Secondary Capture IOD - Module "SC Multi Frame Image"

Tag	Type	VR	Name	Description	PoV	Source
(0028,0301)	1	CS	Burned In Annotation	Indicates whether or not image contains sufficient burned in annotation to identify the patient and date the image was acquired. Enumerated Value: YES NO *"YES" if any identification info is burned in* *"NO" otherwise*	ALWAYS	CONFIG
(0028,0030)	1C	DS	Pixel Spacing	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. See 10.7.1.1 and 10.7.1.3. Required if the image has been calibrated. May be present otherwise. *Multi-value attribute containing 2 values:* *1) adjacent row spacing in mm* *2) adjacent column spacing in mm*	ALWAYS	AUTO

Table 8-36 Multi-frame True Color Secondary Capture IOD - Module "SOP Common"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0016)	1	UI	SOP Class UID	Uniquely identifies the SOP Class. See C.12.1.1.1 for further explanation. See also PS 3.4. *"1.2.840.10008.5.1.4.1.1.7.4"*	ALWAYS	AUTO
(0008,0018)	1	UI	SOP Instance UID	Uniquely identifies the SOP Instance. See C.12.1.1.1 for further explanation. See also PS 3.4. *"1.2.276.0.75.2.1.51.2." constant prefix for generated UIDs*	ALWAYS	AUTO
(0008,0005)	1C	CS	Specific Character Set	Character Set that expands or replaces the Basic Graphic Set. Required if an expanded or replacement character set is used. See C.12.1.1.2 for Defined Terms. *Always "ISO_IR 192" for UTF-8 encoded Unicode*	ALWAYS	AUTO
(0008,0012)	3	DA	Instance Creation Date	Date the SOP Instance was created.	ALWAYS	AUTO
(0008,0013)	3	TM	Instance Creation Time	Time the SOP Instance was created.	ALWAYS	AUTO

8.1.1.4 Raw Data Information Object Definition

IE	Module	Usage
Patient		
	Patient	ALWAYS
	Czm Patient Extended Data	ALWAYS
Study		
	General Study	ALWAYS
Series		
	General Series	ALWAYS
Equipment		
	General Equipment	ALWAYS
	Czm Equipment Extended Data	ALWAYS
Raw Data		
	Acquisition Context	ALWAYS
	Raw Data	ALWAYS
	SOP Common	ALWAYS

Table 8-37 Raw Data IOD - Module "Patient"

Tag	Type	VR	Name	Description	PoV	Source
(0010,0010)	2	PN	Patient's Name	Patient's full name.	ALWAYS	MWL, SRQ, USER
(0010,0020)	2	LO	Patient ID	Primary hospital identification number or code for the patient.	ALWAYS	MWL, SRQ, USER
(0010,0021)	3	LO	Issuer of Patient ID	Identifier of the Assigning Authority that issued the Patient ID.	ANAP	MWL, SRQ, AUTO
(0010,0030)	2	DA	Patient's Birth Date	Birth date of the patient.	ALWAYS	MWL, SRQ, USER
(0010,0040)	2	CS	Patient's Sex	Sex of the named patient. Enumerated Values: M = male F = female O = other	ALWAYS	MWL, SRQ, USER
(0010,1000)	3	LO	Other Patient IDs	Other identification numbers or codes used to identify the patient.	ANAP	MWL, SRQ
(0010,2160)	3	SH	Ethnic Group	Ethnic group or race of the patient.	ANAP	SRQ
(0010,4000)	3	LT	Patient Comments	User-defined additional information about the patient.	ANAP	MWL, SRQ, USER

Table 8-38 Raw Data IOD - Module "Czm Patient Extended Data"

Tag	Type	VR	Name	Description	PoV	Source
(0405,xx52)	3	CS	Normative Database	Ethnically diverse normative data tables associated with patient. Defined terms: NONE DEFAULT ASIAN CHINESE JAPANESE	ANAP	AUTO

Table 8-39 Raw Data IOD - Module "General Study"

Tag	Type	VR	Name	Description	PoV	Source
(0020,000D)	1	UI	Study Instance UID	Unique identifier for the Study	ALWAYS	MWL, SRQ, AUTO
(0008,0020)	2	DA	Study Date	Date the Study started. Date, when procedure step was started.	ALWAYS	AUTO
(0008,0030)	2	TM	Study Time	Time the Study started. Time, when procedure step was started.	ALWAYS	AUTO
(0008,0090)	2	PN	Referring Physician's Name	Name of the patient's referring physician.	VNAP	MWL
(0020,0010)	2	SH	Study ID	User or equipment generated Study identifier. *In scheduled case the source attribute for this value is Requested Procedure ID* *In unscheduled case the value is a Equipment generated Study identifier*	ALWAYS	MWL, SRQ, AUTO
(0008,0050)	2	SH	Accession Number	A RIS generated number that identifies the order for the Study. *Value does not exist in unscheduled case.*	VNAP	MWL
(0008,1030)	3	LO	Study Description	Institution-generated description or classification of the Study (component) performed.	VNAP	MWL, SRQ
(0008,1110)	3	SQ	Referenced Study Sequence	A sequence that provides reference to a Study SOP Class/Instance pair. The sequence may have zero or more Items.	ANAP	MWL
>(0008,1150)	1	UI	Referenced SOP Class UID	Uniquely identifies the referenced SOP Class.	ALWAYS	MWL
>(0008,1155)	1	UI	Referenced SOP Instance UID	Uniquely identifies the referenced SOP Instance.	ALWAYS	MWL
(0008,1032)	3	SQ	Procedure Code Sequence	A Sequence that conveys the type of procedure performed. One or more Items may be included in this Sequence. *This sequence always contains an equipment generated item (see chapter "8.3 Coded Terminology and Templates") and, if available, any MWL provided item of the Requested Procedure Code Sequence.*	ALWAYS	MWL, AUTO
>(0008,0100)	1	SH	Code Value	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	MWL
>(0008,0102)	1	SH	Coding Scheme Designator	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	MWL
>(0008,0103)	1C	SH	Coding Scheme Version	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	MWL
>(0008,0104)	1	LO	Code Meaning	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	MWL

Table 8-40 Raw Data IOD - Module "General Series"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0060)	1	CS	Modality	Type of equipment that originally acquired the data used to create the images in this Series. See C.7.3.1.1.1 for Defined Terms. *Always "OPT"*	ALWAYS	AUTO
(0020,000E)	1	UI	Series Instance UID	Unique identifier of the Series. *"1.2.276.0.75.2.1.51.2.2" extended by machine identifier and time information*	ALWAYS	AUTO
(0020,0011)	2	IS	Series Number	A number that identifies this Series.	ALWAYS	AUTO
(0020,0060)	2C	CS	Laterality	Laterality of (paired) body part examined. Required if the body part examined is a paired structure and Image Laterality (0020,0062) or Frame Laterality (0020,9072) are not sent. Enumerated Values: R = right L = left Note: Some IODs support Image Laterality (0020,0062) at the Image level or Frame Laterality(0020,9072) at the Frame level in the Frame Anatomy functional group macro, which can provide a more comprehensive mechanism for specifying the laterality of the body part(s) being examined.	ALWAYS	AUTO
(0008,0021)	3	DA	Series Date	Date the Series started.	ALWAYS	AUTO
(0008,0031)	3	TM	Series Time	Time the Series started.	ALWAYS	AUTO
(0018,1030)	3	LO	Protocol Name	User-defined description of the conditions under which the Series was performed. Note: This attribute conveys series-specific protocol identification and may or may not be identical to the one presented in the Performed Protocol Code Sequence (0040,0260). *In scheduled case: Same value as for Requested Procedure Description (0032,1060).* *In unscheduled case: Always "OCT" for OCT Scan Data, "OctAnalysis" for OCT Analysis Data*	ANAP	MWL, AUTO
(0008,103E)	3	LO	Series Description	Description of the Series. *Same value as for Performed Protocol Code Sequence – Code Meaning.*	ALWAYS	AUTO
(0008,1070)	3	PN	Operators' Name	Name(s) of the operator(s) supporting the Series.	ANAP	CONFIG
(0018,0015)	3	CS	Body Part Examined	Text description of the part of the body examined. See PS 3.16 Annexes on Correspondence of Anatomic Region Codes and Body Part Examined for Humans and for Animals for Defined Terms Note: Some IODs support the Anatomic Region Sequence (0008,2218), which can provide a more comprehensive mechanism for specifying the body part being examined. *Always "HEAD"*	ALWAYS	AUTO

(0040,0275)	3	SQ	Request Attributes Sequence	Sequence that contains attributes from the Imaging Service Request. The sequence may have one or more Items. *The Request Attributes Sequence is only included in Scheduled Case. In unscheduled case it will not be included.*	ANAP	MWL
>(0040,1001)	1C	SH	Requested Procedure ID	Identifier that identifies the Requested Procedure in the Imaging Service Request. Required if procedure was scheduled. May be present otherwise. Note: The condition is to allow the contents of this macro to be present (e.g., to convey the reason for the procedure, such as whether a mammogram is for screening or diagnostic purposes) even when the procedure was not formally scheduled and a value for this identifier is unknown, rather than making up a dummy value.	ALWAYS	MWL
>(0032,1060)	3	LO	Requested Procedure Description	Institution-generated administrative description or classification of Requested Procedure.	VNAP	MWL
>(0040,0009)	1C	SH	Scheduled Procedure Step ID	Identifier that identifies the Scheduled Procedure Step. Required if procedure was scheduled. Note: The condition is to allow the contents of this macro to be present (e.g., to convey the reason for the procedure, such as whether a mammogram is for screening or diagnostic purposes) even when the procedure step was not formally scheduled and a value for this identifier is unknown, rather than making up a dummy value.	ALWAYS	MWL
>(0040,0007)	3	LO	Scheduled Procedure Step Description	Institution-generated description or classification of the Scheduled Procedure Step to be performed.	VNAP	MWL
>(0040,0008)	3	SQ	Scheduled Protocol Code Sequence	Sequence describing the Scheduled Protocol following a specific coding scheme. This sequence contains one or more Items.	ANAP	MWL
>>(0008,0100)	1	SH	Code Value	See NEMA PS3.3 Section 8.1.	ALWAYS	MWL
>>(0008,0102)	1	SH	Coding Scheme Designator	See NEMA PS3.3 Section 8.2.	ALWAYS	MWL
>>(0008,0103)	1C	SH	Coding Scheme Version	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise.	VNAP	MWL
>>(0008,0104)	1	LO	Code Meaning	See NEMA PS3.3 Section 8.3.	ALWAYS	MWL
(0040,0253)	3	SH	Performed Procedure	User or equipment generated identifier of that part of a Procedure that has	ALWAYS	AUTO

			Step ID	been carried out within this step.		
(0040,0244)	3	DA	Performed Procedure Step Start Date	Date on which the Performed Procedure Step started.	ALWAYS	AUTO
(0040,0245)	3	TM	Performed Procedure Step Start Time	Time on which the Performed Procedure Step started.	ALWAYS	AUTO
(0040,0254)	3	LO	Performed Procedure Step Description	Institution-generated description or classification of the Procedure Step that was performed. *In unscheduled case the attribute value = "OCT" for OCT Scan Data and "OctAnalysis" for OCT Analysis Data.* *In scheduled case the attribute has the same value as for Requested Procedure Description (0032,1060)*	ALWAYS	AUTO
(0040,0260)	3	SQ	Performed Protocol Code Sequence	Sequence describing the Protocol performed for this Procedure Step. One or more Items may be included in this Sequence. *Contains information on the scan protocols used during acquisition resp. analysis protocol used during analysis.* *See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
>(0008,0100)	1	SH	Code Value	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
>(0008,0102)	1	SH	Coding Scheme Designator	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
>(0008,0103)	1C	SH	Coding Scheme Version	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
>(0008,0104)	1	LO	Code Meaning	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO

Table 8-41 Raw Data IOD – Module "General Equipment"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0070)	2	LO	Manufacturer	Manufacturer of the equipment that produced the composite instances *"Carl Zeiss Meditec"*	ALWAYS	AUTO
(0008,0080)	3	LO	Institution Name	Institution where the equipment that produced the composite instances is located.	VNAP	CONFIG
(0008,0081)	3	ST	Institution Address	Mailing address of the institution where the equipment that produced the composite instances is located.	ANAP	CONFIG
(0008,1010)	3	SH	Station Name	User defined name identifying the machine that produced the composite instances.	VNAP	CONFIG
(0008,1040)	3	LO	Institutional Department Name	Department in the institution where the equipment that produced the composite instances is located.	ANAP	CONFIG

(0008,1090)	3	LO	Manufacturer's Model Name	Manufacturer's model name of the equipment that produced the composite instances. *"CIRRUS photo 600" or* *"CIRRUS photo 800"*	ALWAYS	AUTO
(0018,1000)	3	LO	Device Serial Number	Manufacturer's serial number of the equipment that produced the composite instances. Note: This identifier corresponds to the device that actually created the images, such as a CR plate reader or a CT console, and may not be sufficient to identify all of the equipment in the imaging chain, such as the generator or gantry or plate.	ALWAYS	AUTO
(0018,1020)	3	LO	Software Version(s)	Manufacturer's designation of software version of the equipment that produced the composite instances. "2.0.0.38309" and higher versions "2.0.x.y" where x denotes a patch version and y denotes a build version	ALWAYS	AUTO

Table 8-42 Raw Data IOD – Module "Czm Equipment Extended Data"

Tag	Type	VR	Name	Description	PoV	Source
(0405, xx44)	1	LO	Hardware ID	Instrument's ID, Max 32 char	ALWAYS	AUTO
(0405, xx45)	1	LO	Hardware Version	Instrument's version, Max 32 char	ALWAYS	AUTO

Table 8-43 Raw Data IOD – Module "Acquisition Context"

Tag	Type	VR	Name	Description	PoV	Source
(0040,0555)	2	SQ	Acquisition Context Sequence	A sequence of Items that describes the conditions present during the acquisition of the data of the SOP Instance. Zero or more items may be included in this sequence. *Used to identify several software versions/algorithm versions in use when creating the Raw Data instance* *See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
>(0040,A043)	1	SQ	Concept Name Code Sequence	A concept that constrains the meaning of (i.e. defines the role of) the Observation Value. The "Name" component of a Name/Value pair. This sequence shall contain exactly one item.	ALWAYS	AUTO
>>(0008,0100)	1	SH	Code Value	*See chapter "8.3 Coded Terminology and Templates"* • *"APPLICATION", "NIM" code items are stored for any Raw Data instance* • *"ACQUISITION", "NOISE" code items are stored for any Acquisition Raw Data instance* • *"MOTION" code item is stored for any Cube Acquisition Raw Data instance* • *"AVERAGING" code item is stored for any HD raster Acquisition Raw Data instance* • *"RNFLTT", "ONH" code items are stored for any Optic Disc Analysis Raw Data instance*	ALWAYS	AUTO
>>(0008,0102)	1	SH	Coding Scheme Designator	*See chapter "8.3 Coded Terminology and Templates".*	ALWAYS	AUTO

				Always "99CZM_OCTVER"		
>>(0008,0103)	1C	SH	Coding Scheme Version	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise. *See chapter "8.3 Coded Terminology and Templates"* *Always "20120419"*	ALWAYS	AUTO
>>(0008,0104)	1	LO	Code Meaning	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
>(0040,A160)	1C	UT	Text Value	This is the Value component of a Name/Value pair when the Concept implied by Concept Name Code Sequence (0040,A043) is a Text Observation Value. Required if Date (0040,A121), Time (0040,A122), and Person Name (0040,A123) do not fully describe the concept specified by Concept Name Code Sequence (0040,A043). Shall not be present otherwise. *The software/algorithm version*	ALWAYS	AUTO

Table 8-44 Raw Data IOD – Module "Raw Data"

Tag	Type	VR	Name	Description	PoV	Source
(0020,0013)	2	IS	Instance Number	A number that identifies this raw data. The value shall be unique within a series. *Always "1" since there is always only one instance per series.*	ALWAYS	AUTO
(0008,0023)	1	DA	Content Date	The date the raw data creation was started.	ALWAYS	AUTO
(0008,0033)	1	TM	Content Time	The time the raw data creation was started.	ALWAYS	AUTO
(0008,002A)	3	DT	Acquisition Datetime	The date and time that the acquisition of data started. Note: The synchronization of this time with an external clock is specified in the synchronization Module in Acquisition Time synchronized (0018,1800).	ALWAYS	AUTO
(0008,9123)	1	UI	Creator-Version UID	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 "1.2.276.0.75.2.1.51.2.6.1.5.<patch>.<build>" where* • *<patch> is the software version patch number* • *<build> is the software version build number* *of the Application Software*	ALWAYS	AUTO
(0008,114A)	3	SQ	Referenced Instance Sequence	Other Instances significantly related to this Instance. One or more Items may be included in this Sequence. *Analysis Raw Data instances refer to the according Acquisition Raw Data instance*	ANAP	AUTO

>(0008,1150)	1	UI	Referenced SOP Class UID	Uniquely identifies the referenced SOP Class. *Always "1.2.840.10008.5.1.4.1.1.66"*	ALWAYS	AUTO
>(0008,1155)	1	UI	Referenced SOP Instance UID	Uniquely identifies the referenced SOP Instance.	ALWAYS	AUTO
>(0040,A170)	1	SQ	Purpose of Reference Code Sequence	Describes the purpose for which the reference is made. Only a single Item shall be permitted in this sequence. See C.7.6.16.2.5.1. *The scan protocol used during acquisition. See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
>>(0008,0100)	1	SH	Code Value	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
>>(0008,0102)	1	SH	Coding Scheme Designator	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
>>(0008,0103)	1C	SH	Coding Scheme Version	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise. *See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO
>>(0008,0104)	1	LO	Code Meaning	*See chapter "8.3 Coded Terminology and Templates"*	ALWAYS	AUTO

Table 8-45 Raw Data IOD - Module "Sop Common"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0016)	1	UI	SOP Class UID	Uniquely identifies the SOP Class. See C.12.1.1.1 for further explanation. See also PS 3.4. *"1.2.840.10008.5.1.4.1.1.66"*	ALWAYS	AUTO
(0008,0018)	1	UI	SOP Instance UID	Uniquely identifies the SOP Instance. See C.12.1.1.1 for further explanation. See also PS 3.4. *"1.2.276.0.75.2.1.51.2." constant prefix for generated UIDs*	ALWAYS	AUTO
(0008,0005)	1C	CS	Specific Character Set	Character Set that expands or replaces the Basic Graphic Set. Required if an expanded or replacement character set is used. See C.12.1.1.2 for Defined Terms. *Always "ISO_IR 192" for UTF-8 encoded Unicode*	ALWAYS	AUTO
(0008,0012)	3	DA	Instance Creation Date	Date the SOP Instance was created.	ALWAYS	AUTO
(0008,0013)	3	TM	Instance Creation Time	Time the SOP Instance was created.	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.

The case of patient data collision is outlined in chapter of Study Root Query/Retrieve SOP Class.

8.1.3 Attribute Mapping

In scheduled case, the following attributes are mapped from Modality Worklist to instances of

- Encapsulated PDF IOD
- Raw Data IOD
- Multi-frame True Color Secondary Capture Image IOD
- Ophthalmic Photography 8 Bit Image IOD

Modality Worklist		**Instance IOD**		**Editable**
(0010,0010)	Patient's Name	(0010,0010)	Patient's Name	No
(0010,0020)	Patient ID	(0010,0020)	Patient ID	No
(0010,0021)	Issuer of Patient ID	(0010,0021)	Issuer of Patient ID	No
(0010,1000)	Other Patient IDs	(0010,1000)	Other Patient IDs	No
(0010,0030)	Patient's Birth Date	(0010,0030)	Patient's Birth Date	No
(0010,0040)	Patient's Sex	(0010,0040)	Patient's Sex	No
(0010,2160)	Ethnic Group	(0010,2160)	Ethnic Group	No
(0010,4000)	Patient Comments	(0010,4000)	Patient Comments	No
(0008,0050)	Accession Number	(0008,0050)	Accession Number	No
(0008,0090)	Referring Physicians Name	(0008,0090)	Referring Physicians Name	No
(0040,1001)	Requested Procedure ID	(0020,0010)	Study ID	No
		(0040,1001)	Request Attributes Sequence > Requested Procedure ID	No
(0032,1060)	Requested Procedure Description	(0008,1030)	Study Description	No
		(0032,1060)	Request Attributes Sequence > Requested Procedure Description	No
		(0018,1030)	Protocol Name	No
		(0040,0254)	Performed Procedure Step Description	No
(0032,1064)	Requested Procedure Code Sequence	(0008,1032)	Procedure Code Sequence	No
>(0008,0100)	Code Value	>(0008,0100)	Code Value	No
>(0008,0102)	Coding Scheme Designator	>(0008,0102)	Coding Scheme Designator	No
>(0008,0103)	Coding Scheme Version	>(0008,0103)	Coding Scheme Version	No
>(0008,0104)	Code Meaning	>(0008,0104)	Code Meaning	No
(0020,000D)	Study Instance UID	(0020,000D)	Study Instance UID	No

(0008,1110)	Referenced Study Sequence	(0008,1110)	Referenced Study Sequence	No
>(0008,1150)	Referenced Sop Class UID	>(0008,1150)	Referenced Sop Class UID	No
>(0008,1155)	Referenced Sop Instance UID	>(0008,1155)	Referenced Sop Instance UID	No
(0040,1400)	Requested Procedure Comments	(0040,1400)	Request Attributes Sequence > Requested Procedure Comments	No
(0040,0100)	Scheduled Procedure Step Sequence			No
>(0040,0007)	Scheduled Procedure Step Description	(0040,0007)	Request Attributes Sequence > Scheduled Procedure Step Description	No
>(0040,0008)	Scheduled Protocol Code Sequence	(0040,0008)	Request Attributes Sequence > Scheduled Protocol Code Sequence	No
>>(0008,0100)	Code Value	>(0008,0100)	Code Value	No
>>(0008,0102)	Coding Scheme Designator	>(0008,0102)	Coding Scheme Designator	No
>>(0008,0103)	Coding Scheme Version	>(0008,0103)	Coding Scheme Version	No
>>(0008,0104)	Code Meaning	>(0008,0104)	Code Meaning	No
>(0040,0009)	Scheduled Procedure Step ID	(0040,0009)	Request Attributes Sequence > Scheduled Procedure Step ID	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 CIRRUS photo Application Software.

8.2 Data Dictionary of Private Attributes

The Application Software AE does not define Private Attributes of interest.

8.3 Coded Terminology and Templates

The application software uses (0008,9215) Derivation Code Sequence with following codes to specify how an image was derived from an original image.
Occurs in: Ophthalmic Photography 8 Bit SOP Instance, Multi-frame True Color Secondary Capture SOP Instance

Code Value	Coding Scheme Designator	Coding Scheme Version	Code Meaning / Comments
PLAIN_COPY	99CZM_ DERIVATION	20120628	Image is a plain copy of an original image
BURNT_IN_OVERLAY	99CZM_ DERIVATION	20120628	Image has burnt in annotations and overlays
CROPPED	99CZM_ DERIVATION	20120628	Image has been cropped

The application software uses (0008,114A) Referenced Instance Sequence with following codes to specify the source image of a secondary capture B-scan.
Occurs in: Multi-frame True Color Secondary Capture SOP Instance

Code Value	Coding Scheme Designator	Coding Scheme Version	Code Meaning / Comments

SRC_INSTANCE	99CZM	20120401	Source instance used to create this instance

For more detailed information on fundus image acquisition conditions, a few additional parameters, not defined in the Ophthalmic Photography IOD, are used. These parameters are stored in the Acquisition Context Sequence as defined below.
Coding Scheme Designator: "99CZM"
Coding Scheme Version: n/a
Occurs in: Ophthalmic Photography 8 Bit SOP Instance

Coding Name	**Coding Type**	**Values**	**Measurement Units Code (and meaning)**	**Code Meaning / Comments**
Sensor	Coded Concept	"AVT F504C"	n/a	Type of sensor
Aperture	Numeric Value	Always "1"	none (Value 1 means: Aperture was used)	Mechanical aperture was used
AutoFocus	Numeric Value	[0..1]	none (Value 1 means: Auto focus was active)	Auto focus active or inactive

Coding Scheme Designator: "99HIKO"
Coding Scheme Version: "VP4.0"
Occurs in: Ophthalmic Photography 8 Bit SOP Instance

Coding Name	**Coding Type**	**Values**	**Measurement Units Code (and meaning)**	**Code Meaning / Comments**
Flash	Numeric Value	[1..16] for color images [1..24] otherwise	Flash units (Flash of the funduscamera)	Flash level of the funduscamera
Sensor Gain	Numeric Value	[n] as selected in Acquisition settings	Sensor Gain Unit (Gain of digital Camera)	Total gain of the sensor funduscamera system
Gamma	Numeric Value	[n] as selected in Acquisition settings	none (Gamma value of the image)	Gamma value of the image
Fixation point	Numeric Value	[1..max number of fixation points]	none (none)	Number of fixation point within a field method
Fixation point X	Numeric Value	[0..186]	none (in display coordinates)	X-Coordinate of the fix point
Fixation point Y	Numeric Value	[0..110]	none (in display coordinates)	Y-Coordinate of the fix point
Max fix points	Numeric Value	according to selected Fixation protocol (Position) [1] for "Single field" [n] for "n fields" [9] for "Custom"	none (none)	Maximum number of fixation point within a field method

Protocol Name	Coded Concept	[name] where [name] is one of "Standard", "Center", "OpticDisc", "Mouse", "TwoFields", "ThreeFields", "FiveFields", "SevenField", "SevenETDRS", "Custom"	n/a	Name of fixation points protocol
Focus aid	Numeric Value	[0..1]	none (Value 1 means: Focussing aid was ON)	Focus aid on or off
Focus position	Numeric Value	[0..700]	none (Position value of the focus)	Focus position
Eye section	Numeric Value	[0..1]	none (0: Anterior, 1: Posterior)	Eye section

For exact information on algorithm versions, a few additional parameters, not defined in the Raw Data IOD, are used. These parameters are stored in the Acquisition Context Sequence as defined below.
Coding Scheme Designator: "99CZM_OCTVER"
Coding Scheme Version: "20120419"
Occurs in: Raw Data SOP Instance

Coding Name	**Coding Type**	**Meas. Units Code / Values**	**Code Meaning / Comments**
APPLICATION	Text Value	<version string>	Application version for IOD creation.
ACQUISITION	Text Value	<version string>	Application version for acquisition of instance.
DATASET	Text Value	<version string>	Dataset configuration schema version.
NIM	Text Value	<version string>	NIM version at time of creation.
MOTION	Text Value	<version string>	Motion correction algorithm.
AVERAGING	Text Value	<version string>	Line averaging algorithm.
NOISE	Text Value	<version string>	Noise reduction algorithm.
RECONSTRUCTION	Text Value	<version string>	Reconstruction algorithm.
ENFACE	Text Value	<version string>	Enface algorithm.
ND	Text Value	<version string>	Normative database supported by this dataset.
MACSEG	Text Value	<version string>	Macular segmentation algorithm for ILM, RPE and RPEFit.
RNFLTT	Text Value	<version string>	Tomtec segmentation for RNFL and ILM.
ONH	Text Value	<version string>	Optic Nerve Head segmentation for ILM, RPE and RPEFit.
GANGLION	Text Value	<version string>	Ganglion Cell segmentation for GCL and IPL.

DRUSEN	Text Value	<version string>	Drusen analysis algorithm.
ILMRPE	Text Value	<version string>	ILM / RPE segmentation algorithm for macular scans.
RPEFIT	Text Value	<version string>	RPEFit segmentation algorithm for macular scans.
ETDRS	Text Value	<version string>	ETDRS wagon wheel algorithm.
RPE	Text Value	<version string>	Advanced RPE algorithm.
FOVEA	Text Value	<version string>	Fovea detection algorithm.
ONHCONTOUR	Text Value	<version string>	Optic Nerve Head contour algorithm.
MACREG	Text Value	<version string>	Registration for Macular Change.
GPAREG	Text Value	<version string>	Registration for GPA.
FUNDUSREG	Text Value	<version string>	Registration for external fundus image to dataset.

The Application Software AE uses custom coded terminology to describe the procedure and protocol used during acquisition.
Occurs in: Raw Data SOP Instance

Code Value	Coding Scheme Designator	Coding Scheme Version	Code Meaning / Comments
SD-E1	99CZM	1.0	ALL SCANS
SD-S1	99CZM	1.0	Macular Cube 200X200
SD-S2	99CZM	1.0	Macular Cube 512x128
SD-S3	99CZM	1.0	5 Line Raster
SD-S10	99CZM	1.0	Optic Disc Cube 200x200
SD-S21	99CZM	1.0	Anterior Segment 5 Line Raster
SD-S22	99CZM	1.0	Anterior Segment Cube 512x128
SD-S51	99CZM	1.0	HD 5 Line Raster
SD-AIA	99CZM	1.0	Advanced Visualization
SD-MTA	99CZM	1.0	Macular Thickness
SD-HDIA	99CZM	1.0	High Definition Images
SD-ACHDIA	99CZM	1.0	Anterior Segment High Definition Images
SD-ACA	99CZM	1.0	Anterior Segment Analysis
SD-MCA	99CZM	1.0	Macular Change Analysis
SD-GPA	99CZM	1.0	Guided Progression Analysis
SD-ONH	99CZM	1.0	ONH and RNFL OU Analysis
SD-3D	99CZM	1.0	Single Eye Summary
SD-GOUA	99CZM	1.0	Glaucoma OU Analysis
SD-SES	99CZM	1.0	Single Eye Summary

8.4 Greyscale Image Consistency

Not applicable.

8.5 Standard Extended / Specialized/ Private SOP Classes

The following standard extensions are used in the IODs described in chapter 8.1.1 Created SOP Instance(s).

Table 8-6 Encapsulated PDF IOD - Module "Czm Encapsulated Pdf Series Extension"
Table 8-26 Ophthalmic Photography IOD - Module "Czm Ophthalmic Photography Image Extension"
Table 8-38 Raw Data IOD - Module "Czm Patient Extended Data"
Table 8-42 Raw Data IOD – Module "Czm Equipment Extended Data"

8.6 Private Transfer Syntaxes

No Private Transfer Syntax is supported.

The product meets the essential requirements stipulated in Annex I of the 93/42/EEC Directive governing medical devices. The product is labeled with:

CE 0297

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