

EOS

sterEOS Workstation

DICOM Conformance Statement
v1.8

Table of content

1	CONFORMANCE STATEMENT OVERVIEW	3
2	INTRODUCTION	4
2.1	SCOPE AND FIELD OF APPLICATION	4
2.2	ACRONYMS AND ABBREVIATIONS	4
2.3	REFERENCES	4
2.4	INTENDED AUDIENCE	4
2.5	WARNING TO THE READER	5
3	NETWORKING.....	6
3.1	IMPLEMENTATION MODEL	6
3.1.1	<i>Application Data Flow.....</i>	6
3.1.2	<i>Functional Definition of AEs.....</i>	7
3.1.2.1	Verification as SCU.....	7
3.1.2.2	Storage as SCU.....	7
3.1.2.3	Query and Retrieve as SCU	7
3.1.2.4	Color / Grayscale Printing as SCU	7
3.1.2.5	Storage Commitment as SCU.....	7
3.1.2.6	Verification as SCP	7
3.1.2.7	Storage as SCP	7
3.1.2.8	Query and Retrieve as SCP.....	7
3.1.3	<i>Sequencing of Real World Activities.....</i>	8
3.2	AE SPECIFICATIONS.....	9
3.2.1	<i>sterEOS AE Specifications.....</i>	9
3.2.1.1	SOP Classes	9
3.2.1.2	Association Policies.....	10
3.2.1.3	Association Initiation Policy.....	11
3.3	NETWORK INTERFACES	24
3.3.1	<i>Physical Network Interface</i>	24
3.3.2	<i>Additional protocols.....</i>	24
3.4	CONFIGURATION	25
4	MEDIA INTERCHANGE	26
5	SUPPORT OF CHARACTER SETS.....	27
6	ANNEXES	28
6.1	IOD CONTENTS.....	28
6.1.1	<i>Created SOP Instances</i>	28
6.1.1.1	Secondary Capture Image Storage SOP Class	29
6.2	DATA DICTIONARY OF PRIVATE ATTRIBUTES.....	35
6.3	STANDARD EXTENDED/SPECIALIZED/PRIVATE SOP CLASSES	36

1 Conformance Statement Overview

sterEOS workstation is a software application that is dedicated to review a wide range of medical images. It receives its data through DICOM Storage and Query and Retrieve services. Although able to retrieve and handle non-image DICOM objects, sterEOS cannot display or make any use of them, except storing them on remote SCP servers or workstations.

Also, a set of dedicated tools enables user to create derived images (Secondary Captures) of DICOM images.

Finally, a film composer enables user to print DICOM images on DICOM imagers.

sterEOS acts as an SCU for the following SOP Classes:

- Verification
- Storage
- Query and Retrieve
- Print
- Storage Commitment Push Model

sterEOS acts as an SCP for the following SOP Classes:

- Verification
- Storage
- Query and Retrieve

This document is intended to describe sterEOS conformance to DICOM.

2 Introduction

2.1 Scope and field of application

This document describes sterEOS Workstation conformance to the DICOM 3.0 standard.

It contains a short description of application involved and provides technical information about data exchange capabilities of the equipment. The main elements describing these capabilities are the supported DICOM Service Object Pair (SOP) Classes, Roles, Information Object Definitions (IOD) and Transfer Syntaxes.

It applies to version 1.8.0 of sterEOS Workstation and should be read in conjunction with the DICOM standard and its addenda.

2.2 Acronyms and Abbreviations

The following acronyms and abbreviations are used in this document

- ACR American college of Radiology
- ANSI American National Standards Institute
- DICOM Digital Imaging and Communication in Medicine
- DIMSE DICOM Message Service Element
- DIMSE-C DICOM Message Service Element-Composite
- DIMSE-N DICOM Message Service Element-Normalized
- NEMA National Electrical Manufacturers Association
- PDU Protocol Data Unit
- SCP Service Class Provider
- SCU Service Class User
- SOP Service Object Pair
- TCP/IP Transmission Control Protocol/Internet Protocol
- UID Unique Identifier

2.3 References

The DICOM Standard:

NEMA *Digital Imaging and Communications in Medicine, Parts 1 to 20*
(NEMA Standards Publication PS3.X, 2013)
National Electrical Manufacturers Association (NEMA) - Publication Sales
1300 North 17th Street, Suite 1847 - Rosslyn, Virginia 22209 United States of America
Web: <http://medical.nema.org/>

2.4 Intended audience

This Conformance Statement is intended for:

- Potential users;
- System integrators of medical equipment;
- Software designers implementing DICOM interfaces.

It is assumed that the reader is familiar with the DICOM standard.

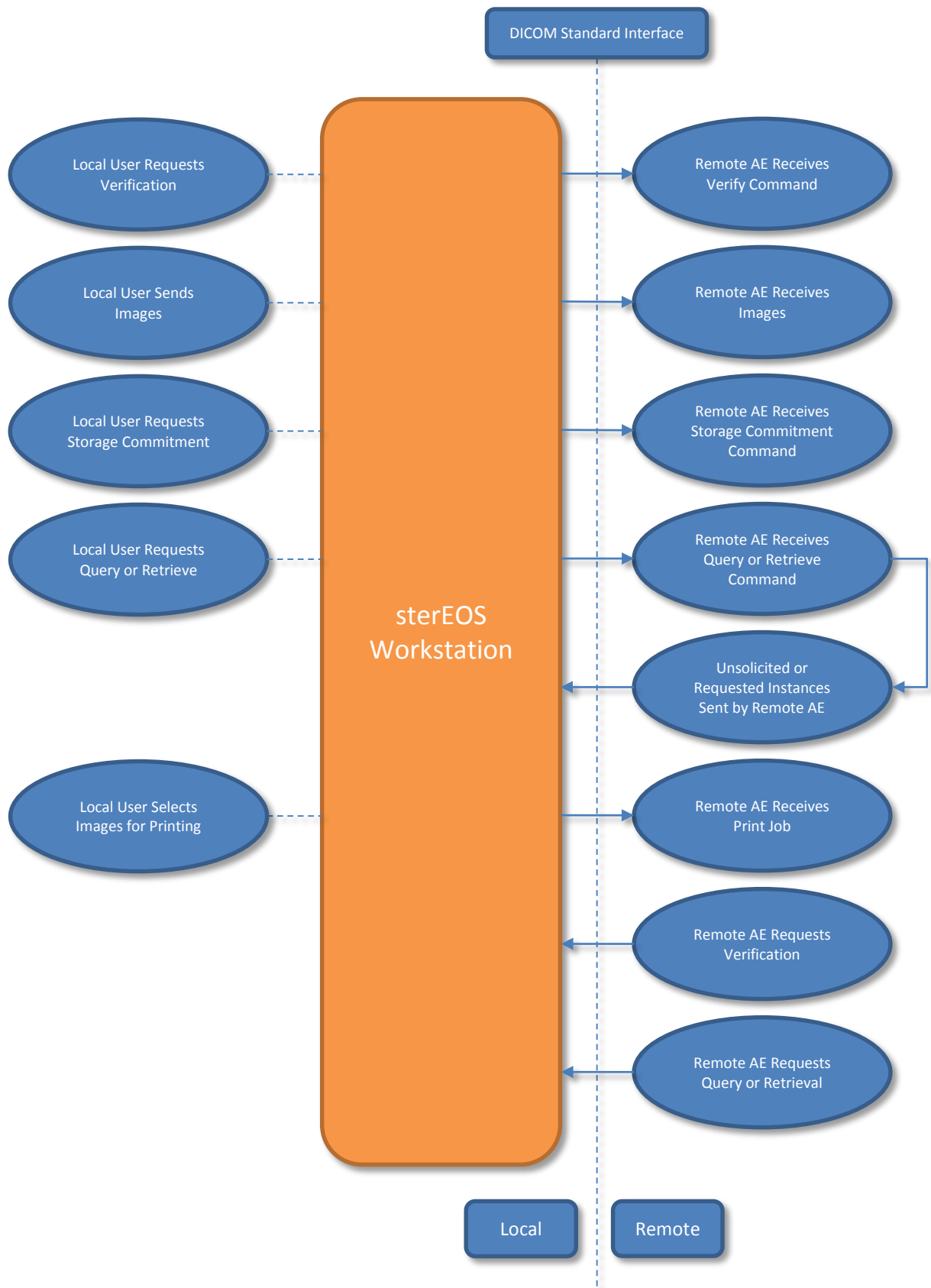
2.5 Warning to the Reader

If another device matches this Conformance Statement based on the comparison with its own Conformance Statement, there is a chance, but no guarantee that they interoperate. DICOM only deals with communication; it is not a standard which specifies what is needed for certain applications to run on a device.

3 Networking

3.1 Implementation Model

3.1.1 Application Data Flow



3.1.2 Functional Definition of AEs

3.1.2.1 Verification as SCU

sterEOS verification is performed through the user interface. User selects a remote host to verify from a pre-configured list and then initiates a verification.

3.1.2.2 Storage as SCU

To store local objects, sterEOS establishes an association with a remote Storage SCP, negotiates its Presentation Contexts according to object SOP Classes and their native Transfer Syntax, and sends all data.

Then, sterEOS closes the association.

3.1.2.3 Query and Retrieve as SCU

sterEOS may use the Query and Retrieve service to retrieve images from a PACS and store them locally.

For each query operation, it establishes one association with the remote Query and Retrieve SCP, performs one C-FIND request, waits for responses and releases the association.

For each retrieve operation, it establishes one association with the remote Query and Retrieve SCP, performs one C-MOVE request, waits for responses and releases the association.

3.1.2.4 Color / Grayscale Printing as SCU

sterEOS may use the Print services as SCU to print films to DICOM imagers.

Print requests are enqueued by sterEOS and processed in background in sequential order. For each print request, sterEOS establishes one association with the remote Print SCP, performs its print request and closes the association when printing is done, successfully or not.

3.1.2.5 Storage Commitment as SCU

To request an acknowledgment for the storage of images, sterEOS may send a Storage Commitment message: it establishes one association with the remote Storage Commitment SCP, sends an N-ACTION request and releases the association.

3.1.2.6 Verification as SCP

sterEOS waits for another application to connect at the presentation address configured for its Application Entity Title. When another application connects, it expects it to be a DICOM application. sterEOS will accept associations with Presentation Contexts for SOP Class of the Verification Service Class.

3.1.2.7 Storage as SCP

sterEOS waits for another application to connect at the presentation address configured for its Application Entity Title. When another application connects, it expects it to be a DICOM application. sterEOS will accept associations with Presentation Contexts for SOP Classes of the Storage Service Class. It will receive images on these Presentation Contexts and write them to files in the format compliant to Part 10 of the DICOM standard.

3.1.2.8 Query and Retrieve as SCP

sterEOS responds to queries based on the records stored in its database.

sterEOS acts as a Service Class Provider of C-MOVE to retrieve images. It does so by obtaining a reference from the database then obtaining the image object itself from the data store.

3.1.3 Sequencing of Real World Activities

Not applicable.

3.2 AE Specifications

3.2.1 sterEOS AE Specifications

3.2.1.1 SOP Classes

sterEOS provides Standard Conformance to the following SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Verification			
Verification SOP Class	1.2.840.10008.1.1	Yes	Yes
Transfer			
<i>Stored Print Storage SOP Class (Retired)</i>	1.2.840.10008.5.1.1.1.27	Yes	Yes
<i>Hardcopy Grayscale Image Storage SOP Class (Retired)</i>	1.2.840.10008.5.1.1.1.29	Yes	Yes
<i>Hardcopy Color Image Storage SOP Class (Retired)</i>	1.2.840.10008.5.1.1.1.30	Yes	Yes
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Yes	Yes
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Yes	Yes
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Yes	Yes
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Yes	Yes
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Yes	Yes
Digital Intra-Oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Yes	Yes
Digital Intra-Oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	Yes	Yes
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	Yes
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.2	Yes	Yes
<i>Ultrasound Multi-frame Image Storage (Retired)</i>	1.2.840.10008.5.1.4.1.1.3	Yes	Yes
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	Yes
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Yes	Yes
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	Yes	Yes
<i>Nuclear Medicine Image Storage (Retired)</i>	1.2.840.10008.5.1.4.1.1.5	Yes	Yes
<i>Ultrasound Image Storage (Retired)</i>	1.2.840.10008.5.1.4.1.1.6	Yes	Yes
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Yes	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	Yes
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Yes	Yes
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	Yes	Yes
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	Yes
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	Yes
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Yes	Yes
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Yes	Yes
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Yes	Yes
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Yes	Yes
<i>X-Ray Angiographic Bi-Plane Image Storage (Retired)</i>	1.2.840.10008.5.1.4.1.1.12.3	Yes	Yes
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	Yes	Yes
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Yes	Yes
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	Yes	Yes
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Yes	Yes
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4	Yes	Yes
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Yes	Yes
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	Yes	Yes
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	Yes	Yes

Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	Yes	Yes
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40	Yes	Yes
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50	Yes	Yes
Key Object Selection Document Storage	1.2.840.10008.5.1.4.1.1.88.59	Yes	Yes
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	Yes	Yes
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	Yes
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Yes	Yes
Query / Retrieve			
Patient Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	No	Yes
Patient Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2	No	Yes
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	Yes
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	Yes
<i>Patient/Study Only Query/Retrieve Information Model - FIND (Retired)</i>	1.2.840.10008.5.1.4.1.2.3.1	No	Yes
<i>Patient/Study Only Query/Retrieve Information Model - MOVE (Retired)</i>	1.2.840.10008.5.1.4.1.2.3.2	No	Yes
Print Management			
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes	No
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Yes	No
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No
Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1	Yes	No
Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No
Storage Commitment			
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Yes	No

3.2.1.2 Association Policies

3.2.1.2.1 General

The following DICOM standard application context shall be used.

Table 3.2.1-1 Application context

Application Context Name	1.2.840.10008.3.1.1.1
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sterEOS contains the following limitation for PDU size:

Table 3.2.1-2 PDU sizes

Maximum PDU size	32KB
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3.2.1.2.2 Number of Associations

The maximum number of associations accepted or maintained by sterEOS is limited only by the physical memory of the machine on which it runs. Typically it can be up to 20. Print operations are performed in background. They are however spooled so that only one Print operation may be performed at the same time.

3.2.1.2.3 Asynchronous Nature

sterEOS does not support asynchronous communication.

Table 3.2.1-3 Asynchronous nature as an association initiator sterEOS / SCU

Maximum number of outstanding asynchronous transactions	0
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3.2.1.2.4 Implementation Identifying Information

sterEOS has the following implementation identifying parameters:

Table 3.2.1-4 Application Identifying Information for DICOM services but Print SCU

SOP Class Name	SOP Class UID
Implementation Class UID	1.2.826.0.1.3680043.2.406.0.4.0.0
Implementation Version Name	GIOL_DIAM_400

Table 3.2.1-5 Application Identifying Information for Print SCU

SOP Class Name	SOP Class UID
Implementation Class UID	1.2.250.1.59.453.284
Implementation Version Name	ACQ-ETIAM-284

3.2.1.3 Association Initiation Policy

3.2.1.3.1 Activity – Verification SCU

3.2.1.3.1.1 Description and Sequencing of Activities

All verification SCU operations are performed synchronously, on user request.

sterEOS may initiate an association with a Verification SCP within its configuration panel to check remote SCP availability.

3.2.1.3.1.2 Proposed Presentation Contexts

Table 3.2.1-6 Proposed presentation contexts for Verification SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification SOP Class	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

3.2.1.3.1.3 SOP Specific Conformance

None.

3.2.1.3.2 Activity – Storage SCU

3.2.1.3.2.1 Description and Sequencing of Activities

All storage SCU operations are performed synchronously, on user request.

sterEOS will initiate an association with a Storage SCP to store local data to a remote application entity. All data then are stored on the same association and then the association is released.

3.2.1.3.2.2 Proposed Presentation Contexts

Table 3.2.1-7 Proposed presentation contexts for Storage SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
<i>See Transfer table in §3.2.1.1 for exhaustive list</i>	<i>See Transfer table in §3.2.1.1 for exhaustive list</i>	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCU	None
		JPEG Lossless, Non-Hierarchical, First-Order Prediction	1.2.840.10008.1.2.4.70	SCU	None
		RLE Lossless	1.2.840.10008.1.2.5	SCU	None

3.2.1.3.2.3 SOP Specific Conformance

Images sent by sterEOS using Storage SCU operation contain their native information. sterEOS never attempts to modify local stored datasets.

sterEOS applies the following rules for the presentation contexts proposed:

- Uncompressed transfer syntaxes are proposed for all storage.
- If SCP does not accept compressed transfer syntaxes, sterEOS will uncompress the related images on the fly.

3.2.1.3.3 Activity – Query and Retrieve SCU

3.2.1.3.3.1 Description and Sequencing of Activities

All query and retrieve operations are performed synchronously, on user request.

For each basic query of a remote application entity for a patient, a study, a series or an instance list, sterEOS will initiate an association, send a C-FIND request command, wait in blocking mode for all C-FIND responses, and then release the association.

For each basic retrieval of a patient, a study, a series or an instance list, sterEOS will initiate an association, send a C-MOVE request command, wait in blocking mode for all C-MOVE responses, and then release the association.

3.2.1.3.3.2 Proposed Presentation Contexts

sterEOS will propose the following Presentation Context:

Table 3.2.1-8 Query and Retrieve Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Study Root Q/R IM - Find	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Study Root Q/R IM - Move	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

3.2.1.3.3 SOP Specific Conformance

Type of Matching rules:

- “*” always added when using *Patient’s Name* attribute for query
- “*” and “?” may be used for any textual query
- Several types of modality may be used for *Modalities in Study* query
- Range matching may be used for Study Date only

Query is always performed at study level ((0008,0052) Query/Retrieve Level [STUDY]), then – for each study – a query is performed at series level [SERIES].

sterEOS will query for the following attributes:

Table 3.2.1-9 Query Attributes

Attribute Name	Tag
Patient Level	
Patient’s Name	(0010,0010)
Patient ID	(0010,0020)
Patient’s Birth Date	(0010,0030)
Study Level	
Study Instance UID	(0020,000D)
Study Date	(0008,0020)
Study Time	(0008,0030)
Accession Number	(0008,0050)
Referring Physician’s Name	(0008,0090)
Modalities in Study	(0008,0061)
Performing Physician’s Name	(0008,1050)
Study ID	(0020,0010)
Series Level	
Series Instance UID	(0020,000E)
Modality	(0008,0060)
Series Description	(0008,103E)
Series Number	(0020,0011)
Request Attributes Sequence	(0040,0275)
>Requested Procedure ID	(0040,1001)
>Scheduled Procedure Step ID	(0040,0009)
Performed Procedure Step Start Date	(0040,0244)
Performed Procedure Step Start Time	(0040,0245)
Composite Object Instance Level	
SOP Instance UID	(0008,0018)
Instance Number	(0020,0013)
SR Document Specific Level	
Completion Flag	(0040,A491)
Verification Flag	(0040,A493)
Verifying Observer Sequence	(0040,A073)

Attribute Name	Tag
>Verification Date Time	(0040,A030)
>Verifying Observer Name	(0040,A075)
Concept Name Code Sequence	(0040,A043)
>Code Value	(0008,0100)
>Coding Scheme Designator	(0008,0102)
Key Object Document Specific Level	
Concept Name Code Sequence	(0040,A043)
>Code Value	(0008,0100)
>Coding Scheme Designator	(0008,0102)
Presentation State Specific Level	
Content Label	(0070,0080)
Content Description	(0070,0081)
Presentation Creation Date	(0070,0082)
Presentation Creation Time	(0070,0083)
Content Creator's Name	(0070,0084)
Referenced Series Sequence	(0008,1115)
>Series Instance UID	(0020,000E)
>Referenced Image Sequence	(0008,1140)
>>Referenced SOP Class UID	(0008,1150)
>>Referenced SOP Instance UID	(0008,1155)

sterEOS will issue a C-MOVE request when a user of sterEOS wishes to move one or more studies / series from a remote DICOM SCP back to sterEOS (retrieve) or another remote DICOM SCP.

3.2.1.3.4 Activity – Print SCU

3.2.1.3.4.1 Description and Sequencing of Activities

Each user Print request made through the Film Composer is spooled and processed sequentially in a background task. Only one Print request is processed at the same time.

For each print request, sterEOS will initiate an association with a Print SCP, process the request on this association and then release the association.

3.2.1.3.4.2 Proposed Presentation Contexts

sterEOS will propose the following different Presentation Contexts:

Table 3.2.1-10 Basic Print Management Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

3.2.1.3.4.3 SOP Specific Conformance

If the DICOM Print software is unable to open an association with the selected destination AE, an error message displays in sterEOS. No message is displayed when successful printing operation responses are received.

After an association has been accepted and is established, sterEOS will send a print job to the Print Server.

Each print job includes the following steps:

- sterEOS first performs a N-GET request to get Printer information.
- sterEOS performs a N-CREATE request to create a film session SOP instance.

For each film to be printed:

- a N-CREATE request is performed to get a Film Box SOP instance
- N-SET requests are made to change some film box instance attributes and to fill image boxes with image pixel data.
- if no print collation is needed, an N-ACTION is requested for the Film Box instance. This causes the film to be printed.
- if print collation is requested, an N-ACTION is performed on the film session.

3.2.1.3.4.3.1 Basic Printer SOP Class

sterEOS can send the following DIMSE commands to a Film Box: N-GET.

◇ N-GET is issued by sterEOS to get Print information. However, this information is not used.

3.2.1.3.4.3.2 Basic Film Session SOP Class

sterEOS can send the following DIMSE commands to a Film Session: N-CREATE, N-SET, N-ACTION, N-DELETE.

◇ N-CREATE is issued by sterEOS to create a Film Session where film boxes will be created.

Attribute Name	Tag ID	Value / Comment
Number of Copies	(2000,0010)	Default is 1

◇ N-SET is issued by sterEOS to change Film Session attributes.

Attribute Name	Tag ID	Value / Comment
Number of Copies	(2000,0010)	Default is 1
Print Priority	(2000,0020)	HIGH, MED, LOW. Default is MED
Medium Type	(2000,0030)	PAPER, BLUE FILM, CLEAR FILM empty string
Film Destination	(2000,0040)	PROCESSOR or MAGAZINE. Not set if default.
Film Session Label	(2000,0050)	Fixed value

◇ N-ACTION is issued by sterEOS to request printing of all Film Boxes in the Film Session.

◇ N-DELETE is issued by sterEOS to request a Film Session deletion.

3.2.1.3.4.3.3 Basic Film Box SOP Class

sterEOS can send the following DIMSE commands to a Film Box: N-CREATE, N-SET, N-ACTION, N-DELETE.

◇ N-CREATE is issued by sterEOS to create a Film Box in a Film Session, where image boxes will be created.

Attribute Name	Tag ID	Value / Comment
Image Display Format	(2010,0010)	STANDARD
Film Orientation	(2010,0030)	PORTRAIT or LANDSCAPE. Not set if default.

◇ N-SET is issued by sterEOS to create change Film Box attributes.

Attribute Name	Tag ID	Value / Comment
Image Display Format	(2010,0010)	STANDARD
Film Orientation	(2010,0030)	PORTRAIT or LANDSCAPE. Not set if default.
Film Size ID	(2010,0050)	8INX10IN, 8_5INX11IN, 10INX12IN, 10INX14IN, 11INX14IN, 14INX14IN, 14INX17IN, 14INX36IN, 14INX51IN, 24CMX24CM, 24CMX30CM, A4 or A3. Not set if default.
Magnification Type	(2010,0060)	NONE, REPLICATE, BILINEAR or CUBIC Not set if default.
Smoothing Type	(2010,0080)	Not set if default.
Border Density	(2010,0100)	BLACK, WHITE Not set if default
Empty Image Density	(2010,0110)	BLACK, WHITE Not set if default
Min Density	(2010,0120)	BLACK, WHITE Not set if default
Max Density	(2010,0130)	BLACK, WHITE Not set if default
Trim	(2010,0140)	YES, NO Not set if default
Referenced Film Session Sequence	(2010,0500)	
Requested Image Size	(2020,0030)	Width (x-dimension) in mm of the image to be printed. Only if print true size activated
>Referenced SOP Class UID	(0008,1150)	
>Referenced SOP Instance UID	(0008,1155)	

◇ N-ACTION is issued by sterEOS to request printing of a Film Boxes.

◇ N-DELETE is issued by sterEOS to request a Film Box deletion.

3.2.1.3.4.3.4 Basic Grayscale Image Box SOP Class

Basic Grayscale Image Box instances are created at the time the Basic Film Box SOP instance is created. The Basic Image Box contains the presentation parameters and image pixel data that applies to a single image of a film sheet.

sterEOS can send the following DIMSE commands to an Image Box: N-SET.

◇ N-SET is issued by sterEOS to set change Image Box attributes.

Attribute Name	Tag ID	Value / Comment
Image Position	(2020,0010)	1 to <number of images in film box>
Polarity	(2020,0020)	NORMAL or REVERSE. Not set if default.
Basic Grayscale Image Sequence	(2020,0110)	
>Samples Per Pixel	(0028,0002)	1
>Photometric Interpretation	(0028,0004)	MONOCHROME2
>Rows	(0028,0010)	
>Columns	(0028,0011)	
>Pixel Aspect Ratio	(0028,0034)	1\1
>Bits Allocated	(0028,0100)	8 or 16
>Bits Stored	(0028,0101)	8 or 12
>High Bit	(0028,0102)	7 or 11
>Pixel Representation	(0028,0103)	0
>Pixel Data	(7FE0,0010)	

3.2.1.3.4.3.5 Basic Color Image Box SOP Class

Basic Color Image Box instances are created at the time the Basic Film Box SOP instance is created. The Basic Image Box contains the presentation parameters and image pixel data that apply to a single image of a film sheet.

sterEOS can send the following DIMSE commands to an Image Box: N-SET.

◇ N-SET is issued by sterEOS to set change Image Box attributes.

Attribute Name	Tag ID	Value / Comment
Image Position	(2020,0010)	1 to <number of images in film box>
Polarity	(2020,0020)	NORMAL or REVERSE. Not set if default.
Basic Color Image Sequence	(2020,0110)	
>Samples Per Pixel	(0028,0002)	3
>Photometric Interpretation	(0028,0004)	RGB
>Planar Configuration	(0028,0006)	0
>Rows	(0028,0010)	
>Columns	(0028,0011)	
>Pixel Aspect Ratio	(0028,0034)	1\1
>Bits Allocated	(0028,0100)	8
>Bits Stored	(0028,0101)	8
>High Bit	(0028,0102)	7
>Pixel Representation	(0028,0103)	0
>Pixel Data	(7FE0,0010)	

3.2.1.3.5 Activity – Storage Commitment SCU

3.2.1.3.5.1 Description and Sequencing of Activities

All Storage Commitment operations are performed synchronously, after a successful archiving (if Storage Commitment request is configured for this AE).

sterEOS will initiate an association, send a N-ACTION request command containing the list of SOPInstanceUID just archived by DICOM Store, wait in blocking mode for all N-ACTION responses, and then release the association.

3.2.1.3.5.2 Proposed Presentation Contexts

sterEOS will propose the following Presentation Context:

Table 3.2.1-11 Storage Commitment Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

3.2.1.3.5.3 SOP Specific Conformance

sterEOS provides standard conformance to the DICOM Storage Commitment Service Class.

sterEOS supports the following elements for this SOP class as a SCU. The Transaction UID Attribute (0008,1195) value generated by sterEOS uniquely identifies each Storage Commitment Request.

Action Type Name	Action Type ID	Attribute Name	Tag
Request Storage Commitment	1	Transaction UID	(0008,1195)
		Referenced SOP Sequence	(0008,1199)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)

Subsequently, sterEOS expects N-EVENT-REPORT from the SCP. sterEOS returns an N-EVENT-REPORT response primitive.

3.2.1.3.6 Activity – Verification SCP

3.2.1.3.6.1 Description and Sequencing of Activities

sterEOS will respond to Verification requests provided by SCU with the ability to determine if sterEOS can receive DICOM requests.

3.2.1.3.6.2 Accepted Presentation Contexts

Table 3.2.1-12 Acceptable presentation contexts for Verification SCP

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification SOP Class	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None

3.2.1.3.6.3 SOP Specific Conformance

SterEOS provides standard conformance to the DICOM Verification Service Class. sterEOS returns one of the following status codes.

Service Status	Further Meaning	Status Code	Behavior
Error	Failed	C000	The operation was not successful.
Success	Success	0000	Operation performed properly.

3.2.1.3.6.4 Presentation Context Acceptance Criterion

sterEOS will always accept a Presentation Context for the Verification SOP Class with the default DICOM transfer syntax listed in Table 3.2.2-9.

3.2.1.3.6.5 Transfer Syntax Acceptance Selection Policies

Since no DICOM data object is associated with a Verification command, only the default DICOM transfer syntax is required/supported.

3.2.1.3.7 Activity – Storage SCP

3.2.1.3.7.1 Description and Sequencing of Activities

sterEOS will archive images that are sent to it from an SCU.

3.2.1.3.7.2 Accepted Presentation Contexts

Table 3.2.1-13 Storage Accepted Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
<i>See Transfer table in §3.2.1.1 for exhaustive list</i>	<i>See Transfer table in §3.2.1.1 for exhaustive list</i>	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	None
		JPEG Lossless, Non-Hierarchical, First-Order Prediction	1.2.840.10008.1.2.4.70	SCP	None
		RLE Lossless	1.2.840.10008.1.2.5	SCP	None

3.2.1.3.7.3 SOP Specific Conformance

sterEOS conforms to the DICOM Storage Service Class at Level 2 (Full). No elements are discarded or coerced by sterEOS. sterEOS returns one of the following status codes:

Service Status	Further Meaning	Status Code	Behavior
Refused	Out of resources	A700	Indicates that there was not enough storage space to store the image. Recovery from this condition is left to the administrative functions available in the database.
	SOP Class not supported	A800	Indicates that the SOP Class of the Image in the C-Store operation did not match the Abstract Syntax negotiated for the Presentation Context.
Error	Dataset does not match SOP Class	A900	Indicates that the Data Set does not encode an instance of the SOP Class specified.
	Failed	C000	The operation was not successful.
	Cannot understand	C005	Indicates that the Data Set cannot be parsed into elements by sterEOS.
Warning	Coercion of data elements	B000	Data elements were modified before being stored.
	Dataset does not match SOP Class	B007	Indicates that the Data Set does not match the SOP Class, but that the image was stored

			anyway.
	Elements discarded	B006	Indicates that some of the elements of the Data Set were discarded.
	Duplicate SOP Instance UID	D000	Indicates that the SOP Instance UID of the specified image is already stored in the database.
Success	Success	0000	Operation performed properly.

3.2.1.3.7.4 Presentation Context Acceptance Criterion

sterEOS will accept any number of Storage Presentation Contexts per association request. Any Abstract Syntax may be specified more than once in an association request, if the Transfer Syntaxes differ between the Presentation Contexts.

3.2.1.3.8 Activity – Query and Retrieve SCP

3.2.1.3.8.1 Description and Sequencing of Activities

sterEOS will respond to query requests that are sent to it from an SCU.

3.2.1.3.8.2 Proposed Presentation Contexts

sterEOS will propose the following Presentation Context:

Table 3.2.1-14 Query and Retrieve Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Patient Root Q/R IM - Find	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Patient Root Q/R IM - Move	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Study Root Q/R IM - Find	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Study Root Q/R IM - Move	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Patient/Study Only Q/R IM - Find	1.2.840.10008.5.1.4.1.2.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Patient/Study Only Q/R IM - Move	1.2.840.10008.5.1.4.1.2.3.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None

Note 1: Find Extended Negotiation will be supported. sterEOS will negotiate with the following information:

Table 3.2.1-15 Find Extended Negotiation

Field Name	Value	Description of Field
Relational queries	1	Relational queries supported

Note 2: Move Extended Negotiation will be supported. sterEOS will negotiate with the following information:

Table 3.2.1-16 Move Extended Negotiation

Field Name	Value	Description of Field
Relational-retrieval	1	Relational retrieval supported

3.2.1.3.8.3 SOP Specific Conformance

SOP classes of the Query/Retrieve Service Class are implemented via the DIMSE C-FIND and C-MOVE services as defined in Part 7 of the DICOM standard.

sterEOS will accept any number of Find Presentation Contexts per association request. Any Abstract Syntax may be specified more than once in an association request, if the Transfer Syntaxes differ between the Presentation Contexts.

sterEOS supports hierarchical queries. sterEOS supports relational queries. sterEOS, by default, supports all mandatory search keys.

Attribute Name	Tag
Patient Level	
Patient's Name	(0010,0010)
Patient ID	(0010,0020)
Patient's Birth Date	(0010,0030)
Study Level	
Study Instance UID	(0020,000D)
Study Date	(0008,0020)
Study Time	(0008,0030)
Accession Number	(0008,0050)
Referring Physician's Name	(0008,0090)
Modalities in Study	(0008,0061)
Performing Physician's Name	(0008,1050)
Study ID	(0020,0010)
Series Level	
Series Instance UID	(0020,000E)
Modality	(0008,0060)
Series Description	(0008,103E)
Series Number	(0020,0011)
Request Attributes Sequence	(0040,0275)
>Requested Procedure ID	(0040,1001)
>Scheduled Procedure Step ID	(0040,0009)
Performed Procedure Step Start Date	(0040,0244)
Performed Procedure Step Start Time	(0040,0245)
Composite Object Instance Level	

Attribute Name	Tag
SOP Instance UID	(0008,0018)
SOP Class UID	(0008,0016)
Instance Number	(0020,0013)
SR Document Specific Level	
Completion Flag	(0040,A491)
Verification Flag	(0040,A493)
Verifying Observer Sequence	(0040,A073)
>Verification Date Time	(0040,A030)
>Verifying Observer Name	(0040,A075)
Concept Name Code Sequence	(0040,A043)
>Code Value	(0008,0100)
>Coding Scheme Designator	(0008,0102)
Key Object Document Specific Level	
Concept Name Code Sequence	(0040,A043)
>Code Value	(0008,0100)
>Coding Scheme Designator	(0008,0102)
Presentation State Specific Level	
Content Label	(0070,0080)
Content Description	(0070,0081)
Presentation Creation Date	(0070,0082)
Presentation Creation Time	(0070,0083)
Content Creator's Name	(0070,0084)
Referenced Series Sequence	(0008,1115)
>Series Instance UID	(0020,000E)
>Referenced Image Sequence	(0008,1140)
>>Referenced SOP Class UID	(0008,1150)
>>Referenced SOP Instance UID	(0008,1155)

sterEOS returns one of the following status codes to a C-FIND request:

Service Status	Further Meaning	Status Code	Behavior
Refused	Out of resources	A700	
Failed	Identifier does not match SOP Class	A900	The specified identifier contains a request that does not match the specified SOP Class.
	Unable to process	C001	For some reason (database off-line?) we cannot process this request at this time.
Cancel	Matching terminated due to Cancel Request	FE00	The original requester canceled this operation.
Pending	Pending	FF00	All Optional Keys are supported in the same manner as Required Keys.
	Pending	FF01	The matching operation is continuing. Warning that one or more Optional Keys were not supported in the same manner as Required Keys.

Success	Success	0000	Operation performed properly.
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sterEOS will respond to retrieve requests that are sent to it from an SCU.

sterEOS will try to establish an association with the move destination specified in the Move request. One or more of the Presentation Contexts listed in the Store section of this document may be negotiated in this association.

sterEOS will accept any number of Move Presentation Contexts per association request. Any Abstract Syntax may be specified more than once in an association request, if the Transfer Syntaxes differ between the Presentation Contexts.

By default, sterEOS sends the IOD using the transfer syntax that was used when the image was originally stored.

sterEOS returns one of the following status codes to a C-MOVE request:

Service Status	Further Meaning	Status Code	Behavior
Refused	Out of resources	A701	Unable to calculate number of matches.
	Out of resources	A702	Unable to perform storage of images to move destination.
Failed	Move destination unknown	A801	The destination of this move request is unknown.
	Identifier does not match SOP Class	A900	The specified identifier contains a request that does not match the specified SOP Class.
	Unable to process	C002	Indicates that sterEOS cannot process this request at this time.
Cancel	Storage terminated due to Cancel Request	FE00	The original requester canceled this operation.
Warning	Warning	B000	Storage complete with one or more failures.
Pending	Pending	FF00	The storage operation is continuing.
	Pending for a long time	FF02	This operation is expected to require a long period of time to complete. The SCU may break the association at any time, but the operation will continue to completion.
Success	Success	0000	Operation performed properly.

3.3 Network Interfaces

3.3.1 Physical Network Interface

sterEOS is indifferent to the physical medium over which TCP/IP executes; it inherits this from the system upon which it executes.

sterEOS provides DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard. It inherits its TCP/IP stack from the Windows system upon which it executes. Default Windows TCP/IP stack is supported.

3.3.2 Additional protocols

None

3.4 Configuration

sterEOS configuration is detailed in sterEOS User's Guide.

sterEOS obtains configuration information from the following sources:

Mapping from Application Entity Title to Presentation Address is provided by the database. Along with this mapping, the database stores those AE titles that are allowed to communicate with sterEOS.

4 Media Interchange

Not applicable.

5 Support of Character Sets

sterEOS supports ISO_IR 100 (ISO 8859-1:1987 Latin Alphabet No. 1 supplementary set).

6 Annexes

6.1 IOD Contents

6.1.1 Created SOP Instances

Table 6.1-1 specifies the attributes of a Secondary Capture Image transmitted by the sterEOS storage application.

The following tables use a number of abbreviations. The abbreviations used in the “Presence of Value” column are:

- VNAP Value Not Always Present (attribute sent zero length if no value is present)
- ANAP Attribute Not Always Present
- ALWAYS Always Present
- EMPTY Attribute is sent without a value

The abbreviations used in the “Source” column:

- USER the attribute value source is from User input
- AUTO the attribute value is generated automatically
- CONFIG the attribute value source is a configurable parameter
- COPY the attribute value source is another SOP instance

Cell subdivision meaning:

In some situations, *Values* cell may be subdivided to represent mutual exclusive cases. Hereafter, an example for Manufacturer value:

Attribute Name	Tag	VR	Values	Presence of Value	Source
Manufacturer	(0008,0070)	LO	Same as original image.	ALWAYS	COPY
			For DICOM Report value is: EOS imaging	ALWAYS	AUTO

Manufacturer is ALWAYS present. It is a COPY of the original image from which the SCPT had been created (*Biospace Med, EOS imaging ...*), except for DICOM Report (SCPT). In this case the value is set to *EOS imaging*.

NOTE: All dates and times are encoded in the local configured calendar and time. Date, Time and Time zone are configured using the Service/Installation Tool.

6.1.1.1 Secondary Capture Image Storage SOP Class

Table 6.1-1 IOD of created Secondary Capture SOP Instances

IE	Module	Reference	Presence of module
Patient	Patient	Table 6.1-2	ALWAYS
Study	General Study	Table 6.1-3	ALWAYS
	Patient Study	Table 6.1-4	ALWAYS
Series	General Series	Table 6.1-5	ALWAYS
Equipment	General Equipment	Table 6.1-6	ALWAYS
	SC Equipment	Table 6.1-7	ALWAYS
Image	General Image	Table 6.1-8	ALWAYS
	Image Pixel	Table 6.1-9	ALWAYS
	SC Image	Table 6.1-10	ALWAYS
	VOI LUT	Table 6.1-11	ALWAYS
	SOP Common	Table 6.1-12	ALWAYS
	Private Application	Table 6.1-13	ALWAYS

Table 6.1-2 Patient module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Patient's Name	(0010,0010)	PN	Same as original image.	ALWAYS	COPY
Patient ID	(0010,0020)	LO	Same as original image.	VNAP	COPY
Patient's Birth Date	(0010,0030)	DA	Same as original image.	ALWAYS	COPY
Patient's Sex	(0010,0040)	CS	Same as original image.	ALWAYS	COPY

Table 6.1-3 General Study module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Study Instance UID	(0020,000D)	UI	Same as original image.	ALWAYS	COPY
Study Date	(0008,0020)	DA	Same as original image.	ALWAYS	COPY
Study Time	(0008,0030)	TM	Same as original image.	ALWAYS	COPY
Referring Physician's Name	(0008,0090)	PN	Same as original image.	VNAP	COPY
Study ID	(0020,0010)	SH	Same as original image.	ALWAYS	COPY
Accession Number	(0008,0050)	SH	Same as original image.	VNAP	COPY
Study Description	(0008,1030)	LO	Same as original image.	VNAP	COPY

Table 6.1-4 Patient Study module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Admitting Diagnoses Description	(0008,1080)	LO	Same as original image.	ANAP	COPY
Patient's Age	(0010,1010)	AS	Same as original image.	ANAP	COPY
Patient's Size	(0010,1020)	DS	Same as original image.	ANAP	COPY
Patient's Weight	(0010,1030)	DS	Same as original image.	ANAP	COPY
Occupation	(0010,2180)	SH	Same as original image.	ANAP	COPY
Additional Patient's History	(0010,21B0)	LT	Same as original image.	ANAP	COPY

Table 6.1-5 General Series module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Modality	(0008,0060)	CS	Same as original image.	ALWAYS	COPY
			For DICOM Report value is: OT	ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI	Generated by device with timestamp.	ALWAYS	AUTO
Series Number	(0020,0011)	IS	Generated by device.	ALWAYS	AUTO
Series Date	(0008,0021)	DA	<yyyymmdd>	ALWAYS	AUTO
Series Time	(0008,0031)	TM	<hhmmss>	ALWAYS	AUTO
Performing Physicians' Name	(0008,1050)	PN	Same as original image.	ANAP	COPY
Protocol Name	(0018,1030)	LO	Same as original image.	ANAP	COPY
Series Description	(0008,103E)	LO	2D <Frontal/Lateral> secondary <mm/dd/yy> <hh:mm:ss> <i>or,</i> 3D <Frontal/Lateral> <mm/dd/yy> <hh:mm:ss> <i>or,</i> 3D Model <mm/dd/yy> <hh:mm:ss> <i>or,</i> 3D Report <mm/dd/yy> <hh:mm:ss>	ALWAYS	AUTO
Operators' Name	(0008,1070)	PN	Same as original image.	ANAP	COPY
Body Part Examined	(0018,0015)	CS	Same as original image.	ANAP	AUTO
			For DICOM Report value is: WHOLEBODY	ALWAYS	AUTO

Table 6.1-6 General Equipment module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Manufacturer	(0008,0070)	LO	Same as original image.	ALWAYS	COPY
			For DICOM Report value is: EOS imaging	ALWAYS	AUTO
Institution Name	(0008,0080)	LO	Same as original image.	ANAP	COPY
Station Name	(0008,1010)	SH	From configuration. Not present for DICOM Report.	ANAP	CONFIG
Manufacturer's Model Name	(0008,1090)	LO	Same as original image.	ANAP	COPY
Device Serial Number	(0018,1000)	LO	Same as original image.	ANAP	COPY
Software Versions	(0018,1020)	LO	Same as original image.	ANAP	COPY
Date of Last Calibration	(0018,1200)	DA	Same as original image.	ANAP	COPY
Time of Last Calibration	(0018,1201)	TM	Same as original image.	ANAP	COPY

Table 6.1-7 SC Equipment module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Conversion Type	(0008,0064)	CS	WSD	ALWAYS	AUTO
Modality	(0008,0060)	CS	Same as original image.	ALWAYS	COPY
			For DICOM Report value is: OT	ALWAYS	AUTO
Secondary Capture Device Manufacturer	(0018,1016)	LO	EOS imaging	ALWAYS	AUTO
Secondary Capture Device Manufacturer's Model Name	(0018,1018)	LO	sterEOS workstation	ALWAYS	AUTO
Secondary Capture Device Software Version	(0018,1019)	LO	<sterEOS workstation version>	ALWAYS	AUTO

Table 6.1-8 General Image module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Instance Number	(0020,0013)	IS	Same as original image.	ALWAYS	COPY
			For DICOM Report value is: <report-page-number>	ALWAYS	AUTO
Patient Orientation	(0020,0020)	CS	From current display setting.	ALWAYS	USER
			Value is empty for DICOM Report.	EMPTY	AUTO
Image Type	(0008,0008)	CS	DERIVED\SECONDARY	ALWAYS	AUTO
			Value is empty for DICOM Report.	EMPTY	AUTO
Acquisition Date	(0008,0022)	DA	Same as original image. Not present for DICOM Report.	ANAP	COPY
Acquisition Time	(0008,0032)	TM	Same as original image. Not present for DICOM Report.	ANAP	COPY
Referenced Image Sequence	(0008,1140)	SQ	Present if (0008,0008) = DERIVED\SECONDARY\BIPLANE A or, DERIVED\SECONDARY\BIPLANE B	ANAP	AUTO
>Referenced SOP Class UID	(0008,1150)	UI	From referenced image.	ANAP	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI	From referenced image.	ANAP	AUTO
>Purpose of Reference Code Sequence	(0040,A170)	SQ	One item	ANAP	AUTO
>>Code Value	(0008,0100)	SH	121314	ANAP	AUTO
			For DICOM Report value is: 121316	ANAP	AUTO
>>Coding Scheme Designator	(0008,0102)	SH	DCM	ANAP	AUTO
>>Code Meaning	(0008,0104)	LO	Other image of biplane pair	ANAP	AUTO
			For DICOM Report value is: Images related to standalone object	ANAP	AUTO
Source Image Sequence	(0008,2112)	SQ	From original image.	ALWAYS	AUTO
>Referenced SOP Class UID	(0008,1150)	UI	SOP Class UID of the original image.	ALWAYS	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI	SOP Instance UID of the original image.	ALWAYS	AUTO
>Purpose of Reference Code Sequence	(0040,A170)	SQ	One item.	ALWAYS	AUTO
>>Code Value	(0008,0100)	SH	121322	ALWAYS	AUTO
>>Coding Scheme Designator	(0008,0102)	SH	DCM	ALWAYS	AUTO
>>Code Meaning	(0008,0104)	LO	Source image for image processing	ALWAYS	AUTO

Attribute Name	Tag	VR	Values	Presence of Value	Source
			operation		
Images in Acquisition	(0020,1002)	IS	Same as original image. Not present for DICOM Report.	ANAP	COPY
Image Comments	(0020,4000)	LT	Same as original image.	ANAP	COPY
			For DICOM Report value is: <current-page/total-pages>	ALWAYS	AUTO
Burned In Annotation	(0028,0301)	CS	Only present for DICOM Report and value is: NO	ANAP	AUTO
Lossy Image Compression	(0028,2110)	CS	Same as original image. Not present for DICOM Report.	ANAP	COPY
Lossy Image Compression Ratio	(0028,2112)	DS	Same as original image. Not present for DICOM Report.	ANAP	COPY
Presentation LUT Shape	(2050,0020)	CS	IDENTITY. Not present for DICOM Report.	ANAP	AUTO

Table 6.1-9 Image Pixel module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Samples per Pixel	(0028,0002)	US	1	ALWAYS	AUTO
			For DICOM Report value is: 3	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	MONOCHROME2	ALWAYS	AUTO
			For DICOM Report value is: RGB	ALWAYS	AUTO
Planar Configuration	(0028,0006)	US	Only present for DICOM Report and value is: 0	ANAP	AUTO
Rows	(0028,0010)	US	Generated by device.	ALWAYS	AUTO
Columns	(0028,0011)	US	Generated by device.	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	Generated by device.	ALWAYS	AUTO
			For DICOM Report value is: 8	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	Generated by device.	ALWAYS	AUTO
			For DICOM Report value is: 8	ALWAYS	AUTO
High Bit	(0028,0102)	US	Generated by device.	ALWAYS	AUTO
			For DICOM Report value is: 7	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	Same as original image.	ALWAYS	COPY
			For DICOM Report value is: 0	ALWAYS	AUTO
Pixel Data	(7FE0,0010)	OW	The Pixel Data itself does not contain any burned-in annotation.	ALWAYS	AUTO

Table 6.1-10 SC Image module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Date of Secondary Capture	(0018,1012)	DA	<yyyymmdd>. Not present for DICOM Report.	ANAP	AUTO
Time of Secondary Capture	(0018,1014)	TM	<hhmmss>. Not present for DICOM Report.	ANAP	AUTO
Pixel Spacing	(0028,0030)	DS	Generated by device. Not present for DICOM Report.	ANAP	AUTO
Pixel Spacing Calibration Type	(0028,0A02)	CS	Same as original image. Not present for DICOM Report.	ANAP	COPY
Pixel Spacing Calibration Description	(0028,0A04)	LO	Same as original image. Not present for DICOM Report.	ANAP	COPY

Table 6.1-11 VOI LUT module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Window Center	(0028,1050)	DS	From current display setting: 0...65536. Not present for DICOM Report.	ANAP	USER
Window Width	(0028,1051)	DS	From current display setting: 0...65536. Not present for DICOM Report.	ANAP	USER

Table 6.1-12 SOP Common module attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
SOP Class UID	(0008,0016)	UI	1.2.840.10008.5.1.4.1.1.7	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Generated by device with timestamp.	ALWAYS	AUTO
Specific Character Set	(0008,0005)	CS	ISO_IR 100	ALWAYS	AUTO
Instance Creation Date	(0008,0012)	DA	<yyyymmdd>. Not present for DICOM Report.	ANAP	AUTO
Instance Number	(0020,0013)	IS	Generated by device.	ALWAYS	AUTO

Table 6.1-13 Private Application module attributes of created SOP Instances

Attribute Name	Tag	VR	Presence of Value	Source
Internal data	(0863,0010)	LO	ALWAYS	AUTO
Internal data	(0863,1010)	SL	ALWAYS	COPY
Internal data	(0863,1023)	SL	ANAP	COPY
Internal data	(0863,1026)	UL	ALWAYS	AUTO
Internal data	(0863,1027)	SL	ANAP	COPY
Internal data	(0863,1028)	SL	ANAP	COPY
Internal data	(0863,1032)	SL	ANAP	AUTO
Internal data	(0863,1033)	SL	ANAP	AUTO
Internal data	(0863,1034)	FL	ANAP	COPY
Internal data	(0863,1035)	SL	ANAP	COPY
Internal data	(0863,1036)	SL	ANAP	COPY
Internal data	(0863,1037)	SL	ANAP	COPY
Internal data	(0863,1040)	FL	ANAP	AUTO
Internal data	(0863,1041)	FL	ANAP	AUTO
Internal data	(0863,1047)	SL	ANAP	COPY
Internal data	(0863,1050)	FL	ALWAYS	AUTO
Internal data	(0863,1055)	FL	ANAP	AUTO
Internal data	(0863,1056)	FL	ANAP	AUTO
Internal data	(0863,1057)	CS	ANAP	AUTO
Internal data	(0863,1058)	SL	ANAP	AUTO
Internal data	(0867,0010)	LO	ANAP	AUTO
Internal data	(0867,1003)	UT	ANAP	AUTO
Internal data	(0867,1020)	SQ	ANAP	AUTO
Internal data	(0867,1021)	LO	ANAP	AUTO
Internal data	(0867,1022)	UT	ANAP	AUTO

NOTE: EOS imaging private fields are specifically managed. However, this management is not described in this document.

The following attributes are not required in the Secondary Capture Image IOD Module but the sterEOS storage application adds them.

Table 6.1-14 Additional attributes of created SOP Instances

Attribute Name	Tag	VR	Values	Presence of Value	Source
Distance Source to Detector	(0018,1110)	DS	Present if biplane images. Same as original image.	ANAP	COPY
Imager Pixel Spacing	(0018,1164)	DS	Present if biplane images. Same as original image.	ANAP	COPY
Detector Active Dimension(s)	(0018,7026)	DS	Present if biplane images. Same as original image.	ANAP	COPY
Distance Source to Isocenter	(0018,9402)	FL	Present if biplane images. Same as original image.	ANAP	COPY
Requesting Physician	(0032,1032)	PN	Same as original image. Absent if not present in original images.	ANAP	COPY

6.2 Data Dictionary of Private Attributes

The Private Attributes added to create SOP Instances are listed in the Table below. sterEOS reserves blocks of private attributes in group **0863** for Secondary Capture 2D and **0867** for Secondary Capture 3D. Further details on usage of these private attributes are contained in Section 6.1.

Table 6.2-1 Data Dictionary of private attributes

Tag	Attribute Name	VR	VM
(0863,0010)	<i>Internal data</i>	LO	1
(0863,1010)	<i>Internal data</i>	SL	1
(0863,1023)	<i>Internal data</i>	SL	1
(0863,1026)	<i>Internal data</i>	UL	1
(0863,1027)	<i>Internal data</i>	SL	1
(0863,1028)	<i>Internal data</i>	SL	1
(0863,1032)	<i>Internal data</i>	SL	1
(0863,1033)	<i>Internal data</i>	SL	1
(0863,1034)	<i>Internal data</i>	FL	1
(0863,1035)	<i>Internal data</i>	SL	1
(0863,1036)	<i>Internal data</i>	SL	1
(0863,1037)	<i>Internal data</i>	SL	1
(0863,1040)	<i>Internal data</i>	FL	1
(0863,1041)	<i>Internal data</i>	FL	1
(0863,1047)	<i>Internal data</i>	SL	1
(0863,1050)	<i>Internal data</i>	FL	1
(0863,1055)	<i>Internal data</i>	FL	1
(0863,1056)	<i>Internal data</i>	FL	1
(0863,1057)	<i>Internal data</i>	CS	1
(0863,1058)	<i>Internal data</i>	SL	1
(0867,0010)	<i>Internal data</i>	LO	1
(0867,1003)	<i>Internal data</i>	UT	1
(0867,1020)	<i>Internal data</i>	SQ	1
(0867,1021)	<i>Internal data</i>	LO	1
(0867,1022)	<i>Internal data</i>	UT	1

6.3 Standard Extended/Specialized/Private SOP Classes

SOP Class Name	SOP Class UID	SCU	SCP
Transfer			
EOS Private Grayscale Softcopy Presentation State Storage SOP Class	1.2.250.1.118.1.1	Yes	Yes

"Biospace med" has changed its name, and will henceforth be known as "EOS imaging"