SIEMENS

AXIOM Aristos® VB21

AX

DICOM Conformance Statement

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Siemens AG, Healthcare Sector 2008,
Henkestr. 127, D-91050 Erlangen, Germany
Siemensstr. 1, D-91301 Forchheim, Germany

Headquarters: Berlin and Munich
Siemens AG, Wittelsbacher Platz 2, D-80333 Munich, Germany

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Table of Contents

1 Introduction

1.1 Overview

The Conformance Statement describes the DICOM interface for the Siemens AXIOM Aristos® [a] VB21 in terms of part 2 of [DICOM].

This introduction describes the application's implemented DICOM functionality in general terms.

1.2 Scope and Field

The AXIOM Aristos® VB21 is a "*syngo*®-speaking[b]" Imaging Modality or workstation. The AXIOM Aristos is designed to be integrated into an environment of medical DICOM-based devices. The AXIOM Aristos DICOM network implementation acts as SCU for the DICOM Storage, Storage Commitment, DICOM Print, DICOM Basic Worklist and Modality Performed Procedure Step Services. Verification is supported in SCU (only via Service environment) and SCP role.

1.3 Audience

This document is intended for hospital staff, health system integrators, software designers or implementers. It is assumed that the reader has a working understanding of DICOM.

1.4 Remarks

DICOM, by itself, does not guarantee interoperability. However, the Conformance Statement facilitates a first-level validation for interoperability between different applications supporting the same DICOM functionality as SCU and SCP, respectively.

This Conformance Statement is not intended to replace validation with other DICOM equipment to ensure proper exchange of information intended.

The scope of this Conformance Statement is to facilitate communication with Siemens and other vendors' Medical equipment. The Conformance Statement should be read and understood in conjunction with the DICOM 3.0 Standard [DICOM]. However, by itself it is not guaranteed to ensure the desired interoperability and a successful interconnectivity.

The user should be aware of the following important issues:

- The comparison of different conformance statements is the first step towards assessing interconnectivity between Siemens and non-Siemens equipment.
- Test procedures should be defined and tests should be performed by the user to validate the connectivity desired. DICOM itself and the conformance parts do not specify this.
- The standard will evolve to meet the users' future requirements. Siemens is actively involved in developing the standard further and therefore reserves the right to make changes to its products or to discontinue its delivery.
- Siemens reserves the right to modify the design and specifications contained herein without prior notice. Please contact your local Siemens representative for the most recent product information.

[a] AXIOM Aristos is a registered trademark of Siemens AG
[b] *syngo* is a registered trademark of Siemens AG

1.5 Definitions, Terms and Abbreviations

Definitions, terms and abbreviations used in this document are defined within the different parts of the DICOM standard.

Additional Abbreviations and terms are as follows:

ACR	American College of Radiology
AE	DICOM Application Entity
ASCII	American Standard Code for Information Interchange
CR	Computed Radiography
CSE	Customer Service Engineer
DB	Database
DCS	DICOM Conformance Statement
DX	Digital X-Ray
EXI	Exposure Index
IIDC	Image-Intensifier Distortion Correction
IOD	DICOM Information Object Definition
ISO	International Standard Organization
MWL	Modality Worklist
NEMA	National Electrical Manufacturers Association
O	Optional Key Attribute
OGP	Organ Program
PDU	DICOM Protocol Data Unit
R	Required Key Attribute
RIS	Radiology Information System
SCU	DICOM Service Class User (DICOM client)
SCP	DICOM Service Class Provider (DICOM server)
SOP	DICOM Service-Object Pair
U	Unique Key Attribute

1.6 References

[DICOM] Digital Imaging and Communications in Medicine (DICOM), NEMA PS 3.1-3.18, 2004

1.7 Structure

This Conformance Statement is subdivided into multiple Parts, which relate to individual documents needed to declare Conformance according to the requirements of “Part 2 - Conformance” of the DICOM Standard.

Those parts are:

- “Network Conformance Statement” for Network related Services
  - Verification - User/Provider
  - Storage - User
  - Storage Commitment - User
  - Basic Grayscale Print - User
  - Basic Worklist - User
  - Modality Performed Procedure Step - User
- A general Annex

2 Implementation Model Verification

The AXIOM Aristos DICOM Service Tool application requests Verification to verify the ability of a remote DICOM application on a remote node to respond to DICOM messages.

Responding to Verification requests from remote nodes is handled by the AXIOM Aristos DICOM network application.

2.1 Application Data Flow Diagram

The AXIOM Aristos DICOM network implementation acts as SCU and SCP for the C-ECHO DICOM network service. The product target Operating System is Windows XP.

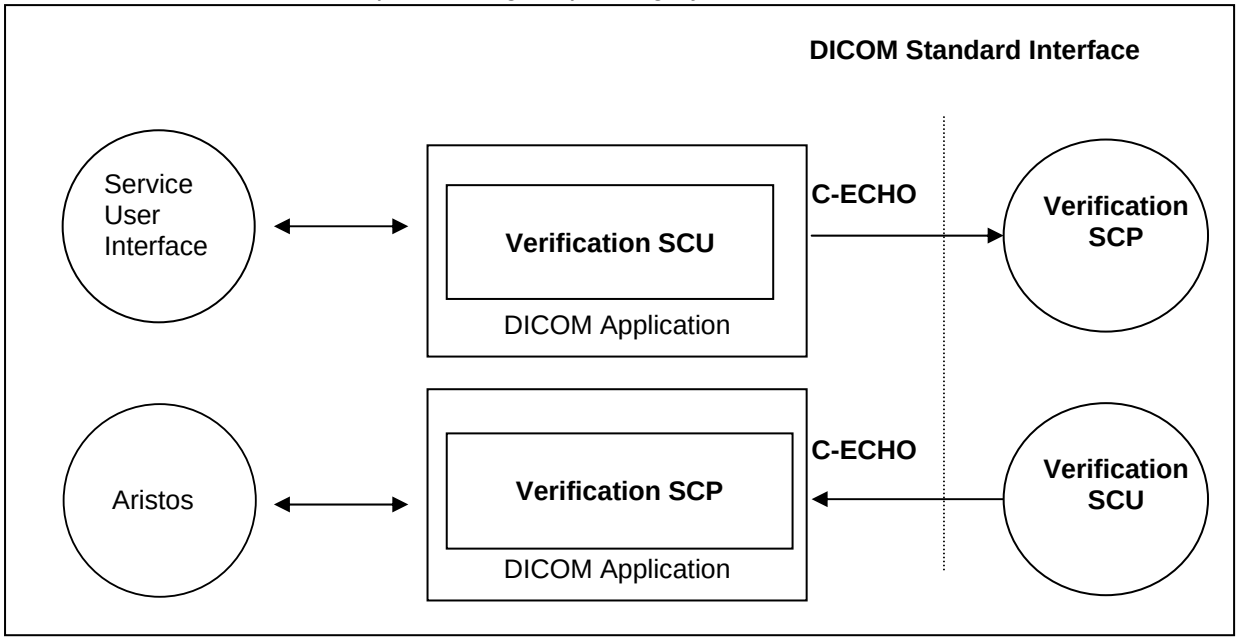


Figure 1: Application Data Flow Diagram - Verification SCU / SCP

2.2 Functional Definitions of Applications

The AXIOM Aristos DICOM Service Tool application opens an association when a “verification” of a remote application is requested during a configuration session. This can be done when entering new data for remote application configuration or to verify existing configuration data.

Verification requests will be processed and responded by the AXIOM Aristos.

2.3 Sequencing of Real-World Activities

Newly entered data have to be saved first, before a “verification” of these data is possible.

3 Application Entity Specification Verification

3.1 Verification AE Specification

3.1.1 Association Establishment Policies

3.1.1.1 General

The AXIOM Aristos DICOM Service Tool application attempts to open an association for verification request whenever the “verification” function is activated during network configuration of a remote DICOM application.

The AXIOM Aristos DICOM application will accept association requests for verification.

The default PDU size used will be 256 KB.

3.1.1.2 Number of Associations

The AXIOM Aristos DICOM Service Tool application initiates one association at a time to request verification.

The AXIOM Aristos DICOM application is able to accept multiple associations at a time. It can handle up to 10 associations in parallel.

3.1.1.3 Asynchronous Nature

The AXIOM Aristos DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

3.1.1.4 Implementation Identifying Information

Implementation Class UID	1.3.12.2.1107.5.9.20000101
Implementation Version Name	“SIEMENS_SWFVD31A”

3.1.2 Association Initiation Policy

The AXIOM Aristos DICOM Service Tool application attempts to initiate a new association for

- DIMSE C-ECHO

service operations.

3.1.2.1 Associated Real-World Activity - Request Verification

3.1.2.1.1 Associated Real-World Activity – Request Verification “verification”

The associated Real-World activity is a C-ECHO request initiated by Service and Configuration SW environment whenever “verification” is requested. If an association to a remote Application Entity is successfully established, Verification with the configured AET is requested via the open

association. If the C-ECHO Response from the remote Application contains a status other than "Success" this will be indicated in the service environment and the association is closed.

3.1.2.1.2 Proposed Presentation Contexts

The AXIOM Aristos DICOM application will propose Presentation Contexts as shown in the following table:

Presentation Context Table – Verification SCU					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None

3.1.2.1.3 SOP Specific Conformance – Verification SCU

The Application conforms to the definitions of the Verification SCU in accordance to the DICOM Standard.

3.1.3 Association Acceptance Policy

The AXIOM Aristos DICOM application attempts to accept a new association for

- DIMSE C-ECHO

3.1.3.1 Associated Real-World Activity - Receive Verification

3.1.3.1.1 Associated Real-World Activity – Receiving Verification Requests from a Remote Node

The associated Real-World activity is a C-ECHO request initiated by a remote Application Entity. An association request for Verification will be accepted. Upon a C-ECHO request the AXIOM Aristos DICOM application will send a C-ECHO Response with status "Success" to the remote Application.

3.1.3.1.2 Accepted Presentation Context – Receiving Verification

The AXIOM Aristos DICOM application will accept Presentation Contexts as shown in the following table:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Verification	1.2.840.10008.1.1	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCP	None

3.1.3.1.3 SOP Specific Conformance – Verification

The Application conforms to the definitions of the Verification SCP in accordance to the DICOM Standard.

4 Implementation Model Storage

The AXIOM Aristos DICOM Application Entity originates associations for Storage of DICOM Composite Information Objects in Remote Application Entities.

4.1 Application Data Flow Diagram

The AXIOM Aristos DICOM network implementation acts as SCU for the C-STORE DICOM network service. The product target Operating System is Windows XP.

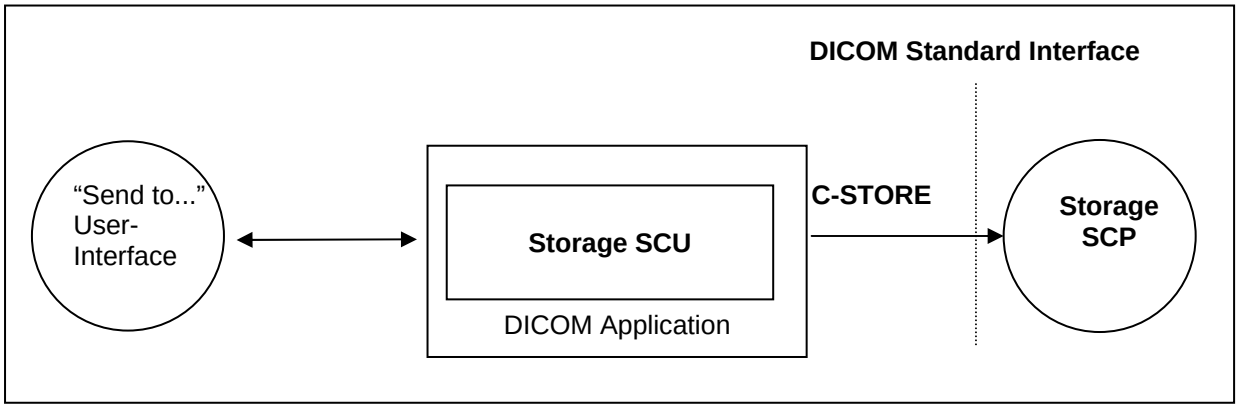


Figure 2: Application Data Flow Diagram – Storage SCU

4.2 Functional Definitions of Application Entities

The Storage SCU is invoked by the job control interface that is responsible for processing network archival tasks. The job consists of data describing the composite image objects selected for storage and the destination. An association is negotiated with the destination application entity and the image data is transferred using the C-STORE DIMSE-Service. Status of the transfer is reported to the job control interface.

4.3 Sequencing of Real-World Activities

not applicable

5 Application Entity Specification Storage

5.1 Storage AEs Specification

SIEMENS AXIOM Aristos DICOM application provides Standard Conformance to the following DICOM SOP Classes as an SCU:

SOP Class Name	SOP Class UID
Computed **R**adiography Image Storage	1.2.840.10008.5.1.4.1.1.1
Digital **X**-Ray Image Storage – for Presentation	1.2.840.10008.5.1.4.1.1.1.1

SIEMENS AXIOM Aristos DICOM products provide Private Conformance to the following DICOM conform private SOP Classes as an SCU:

SOP Class Name	SOP Class UID
CSA Non-Image Storage	1.3.12.2.1107.5.9.1

5.1.1 Association Establishment Policies

5.1.1.1 General

After starting a send job an association request is sent to the destination AE and upon successful negotiation of a Presentation Context the transfer is started.

The default PDU size used will be 256 KB.

5.1.1.2 Number of Associations

The AXIOM Aristos DICOM application initiates several associations at a time, one for each destination to which a transfer request is being processed in the active job queue list.

5.1.1.3 Asynchronous Nature

The AXIOM Aristos DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

5.1.1.4 Implementation Identifying Information

Implementation Class UID	1.3.12.2.1107.5.9.20000101
Implementation Version Name	“SIEMENS_SWFVD31A”

5.1.2 Association Initiation Policy

If a send job is started AXIOM Aristos DICOM application attempts to initiate a new association for

- DIMSE C-STORE

service operations.

5.1.2.1 Associated Real-World Activity - Send

5.1.2.1.1 Associated Real-World Activity – Send Image Objects to a Network Destination

The associated Real-World activity is a C-STORE request initiated by an internal daemon process triggered by a job with network destination. If the process successfully establishes an association to a remote Application Entity, it will transfer each image one after another via the open association. If the C-STORE Response from the remote Application contains a status other than “Success” or “Warning”, the association is aborted.

5.1.2.1.2 Proposed Presentation Context – Send Images

The AXIOM Aristos DICOM application will propose Presentation Contexts as shown in the following table:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Computed **R**adiography Image	1.2.840.10008.5.1.4.1.1.1	JPEG Lossless, Process 14 Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.4.70 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None
Digital **X**-Ray Image for presentation	1.2.840.10008.5.1.4.1.1.1.1	JPEG Lossless, Process 14 Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.4.70 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None
CSA Non-Image	1.3.12.2.1107.5.9.1	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None

Not all the listed transfer syntaxes will be proposed all the time. The contents of this list is configurable, e.g. it could be configured to contain only Implicit Little Endian.

The compression type JPEG lossless can be set in the Application Entity Properties configuration (storage checked). It can by reached via the Service-UI: Configuration / DICOM / Network nodes

5.1.2.1.3 SOP specific Conformance to Storage SOP classes

The Application conforms to the definitions of the Storage SCU in accordance to the DICOM Standard. Depending on configuration the DICOM images created by AXIOM Aristos application conform to the DICOM CR IOD or DICOM DX - For Presentation definitions (Standard extended IODs).

For association and DIMSE level time-outs, please refer to Configuration section of this document.

5.1.2.1.3.1 Optional Attributes

Please see the related Image Object definition tables in the Annex for a list of all DICOM IOD attributes of type 2 and 3, which are encoded by the AXIOM Aristos application.

5.1.2.1.3.2 Specialized Information Object Definitions

The DICOM images created by AXIOM Aristos DICOM application contain additional private elements.

The DICOM nodes are responsible for data consistency when modifying images. All unknown private attributes have to be removed upon modification!

Please see "A.3 Registry of DICOM Data Elements" in the Annex for a Data Dictionary of applied private IOD Attributes.

5.1.3 Association Acceptance Policy

Not applicable

6 Implementation Model Storage Commitment

The Storage Commitment service class defines an application-level class of service that facilitates the commitment to storage. It performs an additional task of commitment of composite objects apart from the network-based storage of images as defined by the Storage Service class. The AXIOM Aristos DICOM implementation supports the Storage Commitment Push Model as SCU.

6.1 Application Data Flow Diagram

The AXIOM Aristos DICOM network implementation acts as SCU for the Storage Commitment Push Model Service using the Storage Commitment Service Class. The product target Operating System is Windows XP.

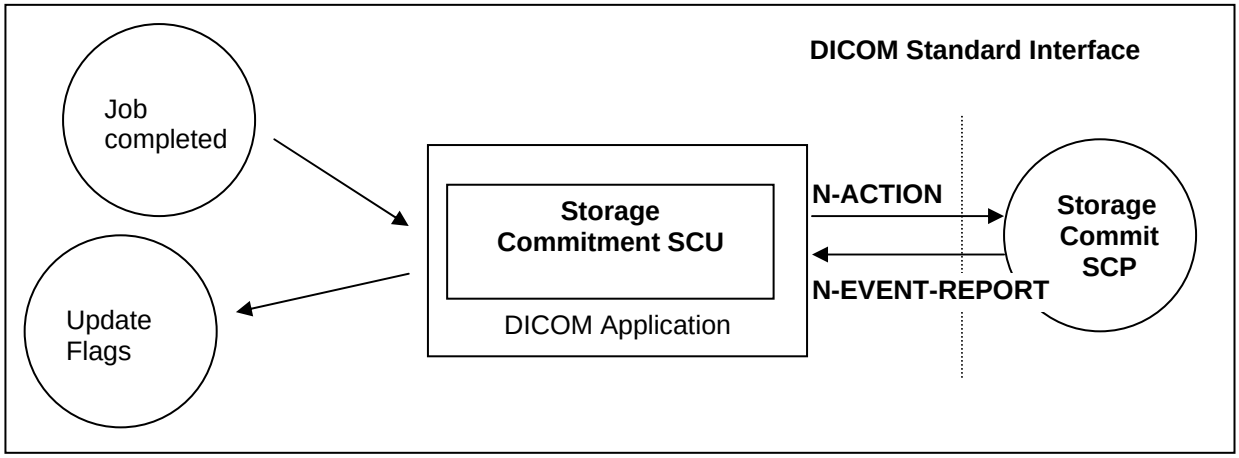


Figure 3: Application Data Flow Diagram – Storage Commitment SCU

6.2 Functional Definitions of Application Entities

With each successfully completed send job, the AXIOM Aristos DICOM Application will populate the Storage Commitment Push Model Action Information from the SOP Instances sent. Then a Storage Commit Request is triggered. Depending on configuration, the AXIOM Aristos DICOM application will keep the association open for responses with a configurable time-out, or closes the association and expects responses on a different association that has to be established by the remote Storage Commitment SCP.

The commitment status derived from the related trigger response will be indicated in the Status Flags of the related entity. It is possible to create triggers (“auto rules”) from this event.

The Transaction UIDs of the pending commitment request are kept “open” for a configurable amount in time (default: 1h). If the “open time” for a pending commitment request has elapsed w/o a related response from the provider, the Transaction UID is removed and the related entities are indicated as “commit failed”.

In any case, commitment will only be requested for previously and successfully sent images.

6.3 Sequencing of real World Activities

The Storage Commitment trigger is automatically derived from the successful completion of a Send Job.

7 AE Specification Storage Commitment

7.1 Storage Commitment AE Specification

SIEMENS AXIOM Aristos DICOM application provides Standard Conformance to the following DICOM SOP Class as an SCU:

SOP Class Name	SOP Class UID
Storage Commitment Push Model	1.2.840.10008.1.20.1

7.1.1 Association Establishment Policies

7.1.1.1 General

With a Send Job successfully completed, the DICOM application will generate a Storage Commitment Action Information that references all Instances of the processed job. The Commit Request is then sent over a single opened association. The AXIOM Aristos will wait for Status responses of the Storage Commitment Request. If the Provider accepts the Storage Commitment with Success Status, the generated Transaction UID, together with study identification data and a time-stamp, is kept. Depending on configuration, the association is closed when the configured time-out has elapsed or a response was received before. If the association is closed before a response was received, the response is then expected on a different association. Multiple Storage Commitment Requests can be pending.

The default PDU size used will be 256 KB.

7.1.1.2 Number of Associations

The AXIOM Aristos DICOM application initiates several associations at a time, one for each destination to which a commit request is being processed in the active job queue list.

7.1.1.3 Asynchronous Nature

The AXIOM Aristos DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

7.1.1.4 Implementation Identifying Information

Implementation Class UID	1.3.12.2.1107.5.9.20000101
Implementation Version Name	“SIEMENS_SWFVD31A”

7.1.2 Association Initiation Policy

The AXIOM Aristos DICOM Application Entity acts as a Service Class User (SCU) for the

- Storage Commitment Push Model Service Class (to request commitment for storage of instances previously sent).

To do so, the AXIOM Aristos will issue a

- N-ACTION DIMSE to request commitment

7.1.2.1 Real-World Activity – Storage Commitment

7.1.2.1.1 Associated Real-World Activity - Job Completed

The AXIOM Aristos Storage Commitment application sends the commit request (N-ACTION-RQ) message and waits for acceptance of this request (N-ACTION-RSP). After receiving this, the transaction is marked as “waiting”.

Depending on a configuration value, the association will then be closed or kept open. In the first case, there is another configurable timeout giving the number of hours (h) and minutes (m) (by default 1h:00m) to wait for the corresponding commit response (N-EVENT-REPORT). In the second case, this time is the (also configurable) time-out for the association. For both cases, if the commit response (N-EVENT-REPORT) does not arrive during the configured time, the transaction will be marked as failed. The AXIOM Aristos does not re-send objects from a failed Storage Commitment result in any case.

If the commit response (N-EVENT-REPORT) received has the status of “complete - failure exists”, the transaction is marked as failed, else the transaction is marked as “completed”; In both cases, a message is shown to the user.

7.1.2.1.2 Proposed Presentation Contexts - Job Completed

The AXIOM Aristos DICOM application will propose Presentation Contexts as shown in the following table:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

7.1.2.1.3 SOP Specific Conformance Statement- Job Completed

The Referenced Study Component Sequence is not supported.

Storage Media File-Set ID and UID Attributes will not be supported in the commitment request (N-ACTION primitive) invoked by the Storage Commitment SCU.

7.1.3 Association Acceptance Policy

The AXIOM Aristos DICOM Application Entity acts as a Service Class User (SCU) for the

- N-EVENT-REPORT DIMSE to receive a storage commitment response from a previous request if the SCP behavior requires a different association than the commit request.

7.1.3.1 Associated Real-World Activity - Commit SCU

7.1.3.1.1 Associated Real-World Activity - Update Flags

The AXIOM Aristos Storage Commitment DICOM Application has sent a Storage Commitment Request and, being configured to receive response on a separate association, has closed the association and then gets an association request from the Storage Commitment SCP that wants to send the results. The AXIOM Aristos DICOM application will await Storage commitment Notification triggers. Any incoming Notification will be checked for validity, that is, if the related Transaction UID is still part of the Pending Request Queue.

If the Notification is valid, the Notification Event Information is evaluated and the related Instances marked with the related status. This status is propagated to the higher level information entities.

The Status Flags directly affected by Storage Commitment results and indicated in the different entities of the Patient Browser list can be one of

- “AC” or “SC” - Successful Commitment, A means archived to configured Archive destination, whereas S means sent to any other destination
- “Af” of “Sf” - Commitment failed.
- “A?” or “S?” - Commitment request is sent, response is pending.

In case of failure the user has to repeat the transfer of images to the Archive destination. Another Storage Commitment will be performed after sending is completed successfully.

7.1.3.1.2 Accepted Presentation Contexts - Update Flags

The Siemens AXIOM Aristos DICOM application will accept Presentation Contexts as shown in the following table:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

7.1.3.1.3 SOP-specific Conformance Statement - Update Flags

If the Commitment response (N-EVENT-REPORT) received has the status of “complete - failure exists”, the transaction is marked as failed, else the transaction is marked as “completed”; In both cases, a message is shown to the user.

The related status flags are set for the committed images in the local database.

The AXIOM Aristos DICOM application will NOT support the Storage Media File Set ID attributes.

8 Implementation Model Print

The Print Management Service Classes define an application-level class of services, which facilitate the printing of images on a hardcopy medium. The *syngo* DICOM print application supports the print management DIMSE services to act as SCU.

8.1 Application Data Flow Diagram

The *syngo* DICOM network implementation acts as SCU for the print management network service. The product target Operating System is Windows XP.

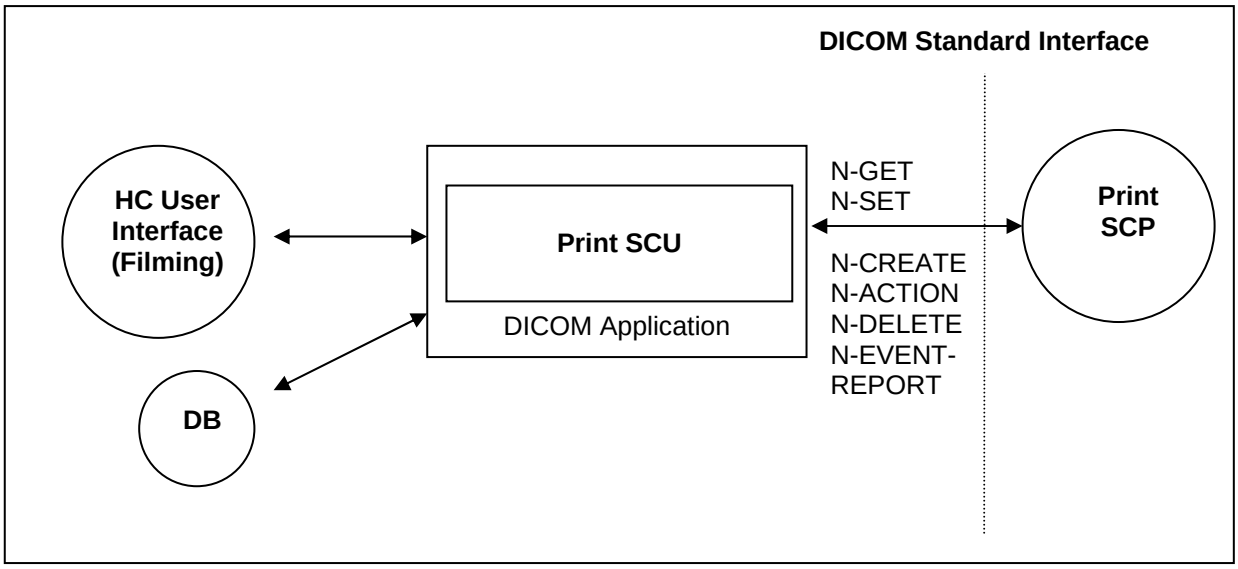


Figure 4: DICOM Application Data Flow Diagram – Print SCU

8.2 Functional Definition of Application Entities

The Print SCU is invoked by the user interface to setup film-sheet layout and whenever an image is ready to be printed on film. The Print SCU will hold and maintain all data needed to compile a complete film-sheet from the data (images, layout, configuration) received. Whenever a film-sheet is ready to print the related data is used to supply the Information to the SOP Classes of the Print Management Service Class. A queue is maintained, in order to intermediately store several film-sheets in case of resource problems on printer.

8.3 Sequencing of Real-World Activities

Not applicable

9 Application Entity Specification Print

9.1 Print Management AE Specification

The *syngo* print management SCU invokes print management DIMSE services to transfer images from the local AE to the remote SCP AE to print images with defined layout on a selected network-based DICOM hardcopy printer. This is done in a “full-page” print mode.

SIEMENS *syngo* DICOM products provide Standard Conformance to the following DICOM Print Management Meta SOP Classes as an SCU:

SOP Class Name	SOP Class UID
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9
- Basic Film Session SOP Class	1.2.840.10008.5.1.1.1
- Basic Film Box SOP Class	1.2.840.10008.5.1.1.2
- Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4
- Printer SOP Class	1.2.840.10008.5.1.1.16
Print Job SOP Class	1.2.840.10008.5.1.1.14
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23

9.1.1 Association Establishment Policies

9.1.1.1 General

Whenever a film is completely set up and printed by command or automatism, the job is prepared for processing. As soon as the queue is ready to process the job is activated. The related Print application will initiate an association to the print destination and process the printing of the related information.

The default PDU size used will be 256 KB.

9.1.1.2 Number of Associations

The *syngo* DICOM Print application initiates one association at a time for each different print device configured.

9.1.1.3 Asynchronous Nature

The *syngo* DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

9.1.1.4 Implementation Identifying Information

Implementation Class UID	1.3.12.2.1107.5.9.20000101
Implementation Version Name	"SIEMENS_SWFVD31A"

9.1.2 Association Initiation Policy

Triggered by the Print job queue the Print Management SCU establishes an association by using the DICOM association services. With the help of the N-GET request for the Printer SOP Class the Status is determined before printing.

With no problem encountered with the N-CREATE/N-SET Services for the related Basic Print SOP Classes the film sheet is set up for printing and the image(s) is(are) transferred to the printer device.

After the last film is printed from queue, the Print application will leave open the association for another 60 seconds. If a new film job is ready for printing within this time limit, the job will be immediately processed over the still open association. If there is no new job, the association is closed if the time-out elapsed. This is done to optimize automated printing.

During the "idle-time" (no open association to printer) the Print application will issue a cyclic camera status request (using N-GET of Printer SOP Class) every 5 minutes.

9.1.2.1 Associated Real-World Activity

9.1.2.1.1 Associated Real-World Activity – Printing a Printer Job Queue Entry

Whenever the user prepares a film-sheet it is forwarded to the Printer Job queue. As soon as the associated Printer device is available the job is activated by opening an association to this device.

The film sheet is internally processed, converted to a Standard/1-1 page and then the page image is sent. Status is controlled by awaiting any N-EVENT message all through the transfer until the last image or film-sheet is sent.

If the response from the remote application contains a status other than Success or Warning the association is aborted.

9.1.2.1.2 Proposed Presentation Context (Presentation Context Table)

The Siemens *syngo* DICOM Print application will propose Presentation Contexts as shown in the following table:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Basic Grayscale Print Management Meta SOP class	1.2.840.10008.5.1.1.9	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Basic film session SOP class	1.2.840.10008.5.1.1.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Basic Film Box SOP class	1.2.840.10008.5.1.1.2	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Basic Grayscale Image Box SOP class	1.2.840.10008.5.1.1.4	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Printer SOP class	1.2.840.10008.5.1.1.16	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Print Job SOP class	1.2.840.10008.5.1.1.14	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Presentation LUT SOP class	1.2.840.10008.5.1.1.23	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

9.1.2.1.3 SOP specific Conformance Statement – Meta SOP Classes

The *syngo* DICOM print management SCU conforms to the DICOM Basic Grayscale Print Management Meta SOP Class.

The application uses a configuration platform to define the properties of the connected DICOM SCP, e.g.:

- maximum number of print jobs in the queue
- maximum number of print copies
- supported film sizes of the connected DICOM SCP
- supported film formats of the DICOM SCP
- lookup table definition.

The printing is only suspended in the case of a failure return status of the SCP.

9.1.2.1.3.1 Basic Film Session SOP class

The Basic Film Session information object definition describes all the user-defined parameters, which are common for all the films of a film session. The Basic Film Session refers to one or more Basic Film Boxes and that are printed on one hardcopy printer.

The *syngo* DICOM print management SCU supports the following DIMSE Service elements for the Basic Film Session SOP Class as SCU:

- N-CREATE, N-DELETE

The Basic Film Session SOP Class N-CREATE-RQ (SCU) uses the following attributes:

Attribute Name	Tag	Usage SCU	Supported Values
Number of Copies	(2000,0010)	U	1
Medium Type	(2000,0030)	U	BLUE FILM CLEAR FILM PAPER
Film Destination	(2000,0040)	U	MAGAZINE PROCESSOR

The number of Copies sent to the DICOM Printer is always 1, the job is sent n times for n copies.

The affected SOP Instance UID received with N-CREATE-RSP message will be kept internally and used for later requests (e.g. N-DELETE-RQ) on the Basic Film Session – see below:

Attribute Name	Tag	Source of Information
Requested SOP Instance UID	(0000,1000) → (0000,1001)	Affected SOP Instance UID of N-CREATE-RSP on Basic Film Session

The N-DELETE-RQ on the Basic Film Session SOP Class is used to remove the complete Basic Film Session SOP Instance hierarchy.

The Basic Film Session SOP class interprets the following status codes (from N-CREATE-RSP, N-DELETE-RSP messages):

Service Status	Meaning	Error Codes
Failed	Film session SOP instances hierarchy does not contain film box SOP instances	C600
	Unable to create print job, print queue is full	C601
	Image size is larger than images box size	C603
Warning	Memory allocation not supported	B600
	Film session printing is not supported	B601
	Film box does not contain image box (empty page)	B602
Success	Film belonging to the film session are accepted for printing	0000

9.1.2.1.3.2 Basic Film Box SOP class

The Basic Film Box information object definition describes all the user-defined parameter of one film of the film session. The Basic Film Box information description defines the presentation parameters, which are common for all images on a given sheet of film.

The Basic Film Box refers to one or more Image Boxes.

Supported Service Elements as SCU are:

- N-CREATE
- N-ACTION
- N-DELETE

The Basic Film Box SOP class N-CREATE-RQ message uses the following attributes (the actual values for each attribute depend on DICOM printer configuration within the *syngo* DICOM print management SCU):

Attribute Name	Tag	Usage SCU	Supported Values
Image Display Format	(2010,0010)	M	STANDARD\1,1
Referenced Film Session Sequence	(2010,0500)	M	
> Referenced SOP Class UID	(0008,1150)	M	1.2.840.10008.5.1.1.1
> Referenced SOP Instance UID	(0008,1155)	M	
Film Orientation	(2010,0040)	M	PORTRAIT
Film Size ID	(2010,0050)	M	8INX10IN, 10INX12IN, 10INX14IN, 11INX14IN,, 14INX14IN, 14INX17IN, 24CMX24CM, 24CMX30CM
Magnification Type	(2010,0060)	M	BILINEAR, CUBIC, NONE, REPLICATE
Border Density	(2010,0100)	U	BLACK, WHITE
Max Density	(2010,0130)	U	0 < Value
Min Density	(2010,0120)	U	0 < Value < 50
Illumination	(2010,015E)	U	0 < Value Required if Presentation LUT is present.
Reflective Ambient Light	(2010,0160)	U	0 < Value Required if Presentation LUT is present.
Referenced Presentation LUT Sequence	(2050,0500)	U	

The N-CREATE-RSP message from the Print SCP includes the Referenced Image Box Sequence with SOP Class/Instance UID pairs that will be kept internally to be further used for the subsequent Basic Image Box SOP Class N-SET-RQ messages.

When all Image Boxes (including parameters) for the film-sheet have been set, the *syngo* DICOM print manager will issue a N-ACTION-RQ message with the SOP Instance UID of the Basic Film Box and the Action Type ID of 1.

The affected SOP Instance UID received with N-CREATE-RSP message will be kept internally and used for later requests (e.g. N-DELETE-RQ) on the Basic Film Box - see below:

Attribute Name	Tag	Source of Information
Requested SOP Instance UID	(0000,1000) → (0000,1001)	Affected SOP Instance UID of N-CREATE-RSP on Basic Film Box

The Basic Film Box SOP class interprets the following status codes:

Service Status	Meaning	Error Codes
Failure	Unable to create print job, print queue is full	C602
	Image size is larger than images box size	C603
Warning	Film box does not contain image box (empty page)	B603
	Requested MinDensity or MaxDensity outside of Printer's operating range	B605
Success	Film accepted for printing	0000

9.1.2.1.3.3 Basic Grayscale Image Box SOP Class

The Basic Grayscale Image Box information object definition is the presentation of an image and image related data in the image area of a film. The Basic Image Box information describes the presentation parameters and image pixel data, which apply to a single image of a sheet of film.

The Grayscale Image Box SOP Class uses only the N-SET-RQ with the following attributes:

Attribute Name	Tag	Usage SCU	Supported Values
Image Position	(2020,0010)	M	1
BASIC Grayscale Image Sequence	(2020,0110)	M	
> Samples per Pixel	(0028,0002)	M	1
> Photometric Interpretation	(0028,0004)	M	MONOCHROME2
> Rows	(0028,0010)	M	
> Columns	(0028,0011)	M	
> Pixel Aspect Ratio	(0028,0034)	M	
> Bits Allocated	(0028,0100)	M	8 or 16
> Bits Stored	(0028,0101)	M	8 or 12
> High Bit	(0028,0102)	M	7 or 11
> Pixel Representation	(0028,0103)	M	0
> Pixel Data	(7FE0,0010)	M	

The Grayscale Image Box SOP class interprets the following status codes:

Service Status	Meaning	Error Codes
Failure	Image contains more pixel than printer can print in Image Box	C603
	Insufficient memory in printer to store the image	C605
Warning	Requested MinDensity or MaxDensity outside of Printer's operating range	B605
Success		0000

9.1.2.1.3.4 Presentation LUT SOP Class

The objective of the Presentation LUT is to realize image hardcopy printing tailored for specific modalities, applications and user preferences.

The output of the Presentation LUT is Presentation Values (P-Values). P-Values are approximately related to human perceptual response. They are intended to facilitate common input for hardcopy. P-Values are intended to be independent of the specific class or characteristics of the hardcopy device.

The Presentation LUT SOP Class uses only the N-CREATE-RQ with the following attributes:

Attribute Name	Tag	Usage SCU	Supported Values
Presentation LUT Shape	(2050,0020)	U	IDENTITY

The affected SOP Instance UID received with N-CREATE-RSP message will be kept internally and is used for later requests on the Basic Film Box (N-CREATE-RQ) and on the Presentation LUT (N-DELETE-RQ) - see below:

Attribute Name	Tag	Source of Information
Requested SOP Instance UID	(0000,1000) → (0000,1001)	Affected SOP Instance UID of N-CREATE-RSP on Presentation LUT

The Presentation LUT SOP class interprets the following status codes:

Service Status	Meaning	Error Codes
Warning	Requested MinDensity or MaxDensity outside of HCD's operating range. HCD will use its respective minimum or maximum density value instead.	B605

Service Status	Meaning	Error Codes
Success	Presentation LUT successfully created	0000

9.1.2.1.3.5 Printer SOP Class

The Printer SOP Class is the possibility to monitor the status of the hardcopy printer in a synchronous and an asynchronous way.

The SCU uses the mandatory N-EVENT Report DIMSE service to monitor the changes of the printer status in an asynchronous way.

It can directly ask the Printer (SCP) for its status or receive Events from the Printer asynchronously:

- N-GET as SCU
- N-EVENT-REPORT as SCU In both cases the following information is supported:

Used Printer N-EVENT Report attributes

Event-type Name	Event	Attributes	Tag	Usage SCU
Normal	1			
Warning	2	Printer Status Info	(2110,0020)	U
Failure	3	Printer Status Info	(2110,0020)	U

Mandatory Printer N-GET-RSP, N-EVENT-REPORT-RQ attributes

Attribute Name	Tag	Usage SCP	Supported Values
Printer Status	(2110,0010)	M	NORMAL, FAILURE, WARNING
Printer Status Info	(2110,0020)	M	See tables in Annex for details.

Note: For a detailed description on how *syngo* reacts on different printer status messages, please refer to the Annex section “DICOM Print SCU – detailed status displays”.

9.1.2.1.3.6 Print Job SOP Class

The Print Job SOP Class is the possibility to monitor the execution of the print process.

The *syngo* DICOM Print Management application supports the optional N-EVENT-REPORT DICMSE Service to receive the changes of the Print Job Status in an asynchronous way.

It can receive Events from the Print SCP asynchronously

Note: syngo does not support receiving N-EVENT from camera during print sessions; normally this is configurable in the camera.

N-EVENT-REPORT The following information is supported:

Used Print Job N-EVENT Report attributes

Event-type Name	Event	Attributes	Tag	Usage SCU
Normal	1	Execution Status Info	(2100,0030)	U
		Print Job ID	(2100,0010)	-- (Print Queue Management SOP Class not supported)
		Film Session Label	(2000,0050)	U
		Printer Name	(2110,0030)	U
Printing	2	Execution Status Info	(2100,0030)	U

Event-type Name	Event	Attributes	Tag	Usage SCU
		Print Job ID	(2100,0010)	-- (Print Queue Management SOP Class not supported)
		Film Session Label	(2000,0050)	U
		Printer Name	(2110,0030)	U
Done	3	Execution Status Info	(2100,0030)	U
		Print Job ID	(2100,0010)	-- (Print Queue Management SOP Class not supported)
		Film Session Label	(2000,0050)	U
		Printer Name	(2110,0030)	U
Failure	4	Execution Status Info	(2100,0030)	U
		Print Job ID	(2100,0010)	-- (Print Queue Management SOP Class not supported)
		Film Session Label	(2000,0050)	U
		Printer Name	(2110,0030)	U

Note: For a detailed description on how *syngo* reacts on different printer status messages, please refer to the Annex section “DICOM Print SCU – detailed status displays”.

9.1.3 Association Acceptance Policy

Not applicable

10 Implementation Model Worklist

The Basic Worklist Management Service class defines an application-level class of service that facilitates the transfer of worklists from the information system to the imaging modality. The worklist is queried by the AE and supplies the SCU with the scheduled tasks, which have to be performed on the modality. The AXIOM Aristos DICOM worklist application supports the worklist service as SCU.

10.1 Application Data Flow Diagram

The AXIOM Aristos DICOM network implementation acts as SCU for the Basic Worklist Service using the Modality Worklist SOP Class. The product target Operating System is Windows XP.

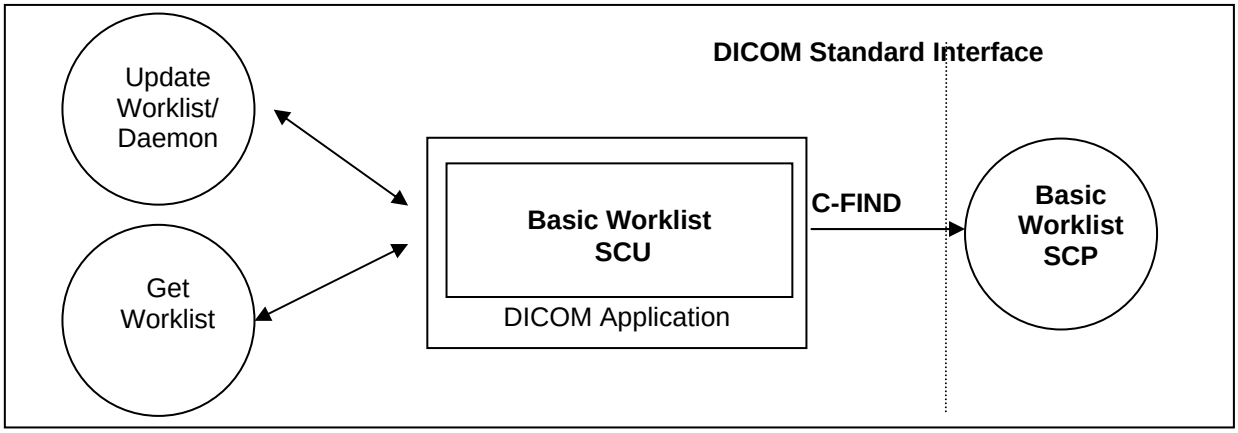


Figure 5: AXIOM Aristos Application Flow Diagram – Basic Worklist SCU

10.2 Functional Definitions of Application Entities

The worklist SCU (“broad query”) is invoked from the patient browser user interface or by timer to request the worklist from a remote Information System (Modality Worklist Class SCP). This is done to perform a match to the internal worklist query keys specified in the C-Find DIMSE service issued for the Modality Worklist Model.

The worklist SCP responses to the C-FIND query and scheduled imaging service requests (scheduled procedure steps) and patient demographic information will be downloaded from the information system to the AXIOM Aristos modality. All information retrieved will be hold in the scheduling database for usage during Patient registration procedure.

Furthermore the patient based Query dialog from the patient browser allows to enter specific matching criteria ("narrow query") for the issue worklist query. With the response data the Patient Registration dialog can be populated according availability within the worklist response identifier.

10.3 Sequencing of Real-World Activities

The “narrow” (interactive) Worklist Query requires that sufficient matching keys or a unique matching key are/is entered before the query is issued. Only then a single response can be expected to complete the registration dialog.

11 Application Entity Specification Worklist

11.1 Modality Worklist Service AE Specification

The Modality Worklist SCU (patient registration in conjunction with the network application) requests that the remote SCP performs a match of all keys specified in the query against the information in its worklist database.

The AXIOM Aristos DICOM network implementation acts as SCU for the Basic Worklist Service using the Modality Worklist SOP Class:

SOP Class Name	SOP Class UID
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31

11.1.1 Association Establishment Policies

11.1.1.1 General

It is possible to configure a cyclic update of the modality scheduler database through a background worklist request with date/time and modality information.

In addition the user can request worklist update with “Update Worklist”. No duplicate entries will be added in the Scheduler DB. Entries are uniquely identified by the Study Instance UID (0020,000D) for the Requested Procedure and the SPS ID (0040,0009) in the SPS Sequence (0040,0100).

An interactive worklist query can be issued with search criteria entered in the patient based Query dialog from the patient browser.

The default PDU size used will be 256 KB.

11.1.1.2 Number of Associations

The AXIOM Aristos DICOM application initiates one association at a time to query worklist entry data.

11.1.1.3 Asynchronous Nature

The AXIOM Aristos DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

11.1.1.4 Implementation Identifying Information

Implementation Class UID	1.3.12.2.1107.5.9.20000101
Implementation Version Name	“SIEMENS_SWFVD31A”

11.1.2 Association Initiation Policy

The network application will cyclically query the worklist and by request of patient registration interface. Ever then it establishes an association by using the DICOM association services. During association establishment the negotiation of SOP classes to exchange the capabilities of the SCU and the SCP is not supported.

The following DIMSE-C operation is supported as SCU:

- C-FIND

11.1.2.1 Real-World Activity

11.1.2.1.1 Associated Real-World Activity - Query (Update) Worklist

A network application will perform worklist queries with the C-FIND request at regular intervals. In addition it can be triggered by immediate request. The received worklist items will be compared with the contents of the local scheduler database. New items will be inserted into scheduler database.

After each broad-query, all RP/SPS that were canceled or rescheduled to another modality at the RIS will be automatically removed from the Scheduler DB if:

1. the Examination of this procedure has not been started or finished yet, and

2. the corresponding configuration item “Automatic removal of canceled/rescheduled Request” was checked in the Service UI under DICOM HIS/RIS Node.

No automatic clean up of the scheduler DB is performed after a Patient base Query since the worklist received does not give the complete list of all currently scheduled procedures for the modality.

11.1.2.1.2 Proposed Presentation Contexts

The AXIOM Aristos DICOM application will propose Presentation Contexts as shown in the following table:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Modality Worklist Information Model- FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

11.1.2.1.3 SOP Specific Conformance Statement

11.1.2.1.3.1 Search Key Attributes of the Worklist C-FIND

The AXIOM Aristos DICOM worklist SCU supports “broad worklist queries” with all required search keys. The following tables describe the “broad query” search keys that the SCU supports.

Attribute Name	Tag	Matching Key Type	Query Value
Scheduled Procedure Step			
Scheduled Procedure Step Sequence	(0040,0100)	R	
>Scheduled Station AE Title	(0040,0001)	R	<own AET> or <zero-length>[a]
>Scheduled Procedure Step Start Date	(0040,0002)	R	<act. Date> or range from UI[b]
>Scheduled Procedure Step Start Time	(0040,0003)	R	"000000.000000-235959.000000" or range from UI [b]
>Modality	(0008,0060)	R	<own Modality> or <zero-length> [a]

11.1.2.1.3.2 Return Key Attributes of the Worklist C-FIND

The AXIOM Aristos DICOM worklist SCU supports worklist queries with return key attributes of all types. The following tables describe the return keys that the SCU supports.

An “x” in the **UI** column will indicate the attribute is visualized when browsing the Worklist results with Patient Browser and/or during Patient Registration. The Patient Browser display is additionally influenced by the related Browser configuration.

A DICOM attribute tag in the **IOD** column will indicate that the related attribute is included into the SOP Instances of the IODs created during processing of this worklist request.

A DICOM attribute tag in the **MPPS** column will indicate that the related attribute is included into the SOP Instances of the MPPS objects created during processing of this worklist request. (See also the tables “Attributes used for the Performed Procedure Step N-CREATE” and “Attributes used for the Performed Procedure Step N-SET”.)

Attribute Name	Tag	Return Key Type	UI	IOD	MPPS
SOP Common					
Specific Character Set	(0008,0005)	1C	-	(0008,0005)	(0008,0005)
Scheduled Procedure Step					
Scheduled Procedure Step Sequence	(0040,0100)	1			
>Modality	(0008,0060)	1	x	(0008,0060)[c]	(0008,0060)
>Requested Contrast Agent	(0032,1070)	2C	x		
>Scheduled Station AE Title	(0040,0001)	1	x		
>Scheduled Procedure Step Start Date	(0040,0002)	1	x		
>Scheduled Procedure Step Start Time	(0040,0003)	1	x		
>Scheduled Procedure Step End Date	(0040,0004)	3	-		
>Scheduled Procedure Step End Time	(0040,0005)	3	-		
>Scheduled Performing Physician’s Name	(0040,0006)	1	x	(0008,1050)[d]	(0008,1050)[d]

[a] It depends on user configuration (Options->Configuration->Patient Registration) if the "own AET" or "Modality" is provided or not. Use the "HIS/RIS" tab card for configuration.
[b] It depends on user configuration (Options->Configuration->Patient Registration) if the actual Date with a full time range or an interactive input dialog for date/time specification is used.
[c] "Modality" in IOD is taken from system configuration (CR or DX)
[d] “Scheduled Performing Physician’s Name” is taken as default for “Performing Physician’s Name”

Attribute Name	Tag	Return Key Type	UI	IOD	MPPS
>Scheduled Procedure Step Description	(0040,0007)	1C	x	(0040,0007) (0040,0254)[a]	(0040,0007) (0040,0254)[a]
>Scheduled Protocol Code Sequence [b]	(0040,0008)	1C	-	(0040,0008)	(0040,0008) (0040,0260) [c]
>>Code Value	(0008,0100)	1C	x		
>>Coding Scheme Designator	(0008,0102)	1C	x		
>>Coding Scheme Version	(0008,0103)	3	x		
>>Code Meaning	(0008,0104)	3	x		
>Scheduled Procedure Step ID	(0040,0009)	1	x	(0040,0009) (0040,0253)[d]	(0040,0009) (0040,0253)[d]
>Scheduled Station Name	(0040,0010)	2	x		
>Scheduled Procedure Step Location	(0040,0011)	2	x		(0040,0243)[e]
>Pre-Medication	(0040,0012)	2C	x		
>Scheduled Procedure Step Status	(0040,0020)	3	x		
>Comments on the Scheduled Procedure Step	(0040,0400)	3	-		
Requested Procedure					
Referenced Study Sequence [f]	(0008,1110)	2	-	(0008,1110)	(0008,1110)
>Referenced SOP Class UID	(0008,1150)	1C	-		
>Referenced SOP Instance UID	(0008,1155)	1C	-		
Study Instance UID	(0020,000D)	1	-	(0020,000D)	(0020,000D)
Requested Procedure Description	(0032,1060)	1C	x	(0032,1060)	(0032,1060)
Requested Procedure Code Sequence [f]	(0032,1064)	1C	-	(0008,1032)[g] (0032,1064)	(0008,1032)[g]
>Code Value	(0008,0100)	1C	x		
>Coding Scheme Designator	(0008,0102)	1C	x		
>Coding Scheme Version	(0008,0103)	3	x		
>Code Meaning	(0008,0104)	3	x		
Requested Procedure ID	(0040,1001)	1	x	(0040,1001) (0020,0010)[h]	(0040,1001) (0020,0010)[h]
Reason for the Requested Procedure	(0040,1002)	3	-		
Requested Procedure Priority	(0040,1003)	2	x		
Patient Transport Arrangements	(0040,1004)	2	-		
Requested Procedure Location	(0040,1005)	3	-		
Confidentiality Code	(0040,1008)	3	-		
Reporting Priority	(0040,1009)	3	-		
Names of intended Recipients of Results	(0040,1010)	3	-	(0008,1048)[i]	
Requested Procedure Comments	(0040,1400)	3	x		
Imaging Service Request					
Accession Number	(0008,0050)	2	x	(0008,0050)	(0008,0050)
Referring Physician's Name	(0008,0090)	2	x	(0008,0090)	
Requesting Physician	(0032,1032)	2	x	(0032,1032) (0008,1048)[j]	
Requesting Service	(0032,1033)	3	x	(0032,1033)	
Reason for the Imaging Service Request	(0040,2001)	3	-		

[a] "Scheduled Procedure Step Description" is taken as default for "Performed Procedure Step Description"
[b] Uses universal sequence match
[c] "Scheduled Protocol Code Sequence" is taken as default for "Performed Protocol Code Sequence"
[d] "Scheduled Procedure Step ID" is taken as default for "Performed Procedure Step ID"
[e] "Scheduled Procedure Step Location" is taken as default for "Performed Location"
[f] Uses universal sequence match
[g] "Requested Procedure Code Sequence" is taken as default for "Procedure Code Sequence"
[h] "Requested Procedure ID" is taken as default for "Study ID"
[i] "Names of intended Recipients of Results" are added to the list of "Physician(s) of Record"
[j] "Requesting Physician" is added to the list of "Physician(s) of Record"

Attribute Name	Tag	Return Key Type	UI	IOD	MPPS
Issuing Date of Imaging Service Request	(0040,2004)	3	-		
Issuing Time of Imaging Service Request	(0040,2005)	3	-		
Placer Order Number / Imaging Service Request [a]	(0040,2016)	3	-		(0040,2016)
Filler Order Number / Imaging Service Request [b]	(0040,2017)	3	-		(0040,2017)
Order entered by …	(0040,2008)	3	-		
Order Enterer's location	(0040,2009)	3	-		
Order Callback Phone Number	(0040,2010)	3	-		
Imaging Service Request Comments	(0040,2400)	3	x		
Visit Identification					
Institution Name	(0008,0080)	3	x	(0008,0080)	
Institution Address	(0008,0081)	3	-	(0008,0081)	
Admission ID	(0038,0010)	2	x		
Issuer of Admission ID	(0038,0011)	3	-		
Visit Status					
Current Patient Location	(0038,0300)	2	x		
Visit Relationship					
Referenced Study Sequence [c]	(0008,1110)	3	-	(0008,1110)	(0008,1110)
>Referenced SOP Class UID	(0008,1150)	1C	-		
>Referenced SOP Instance UID	(0008,1155)	1C	-		
Referenced Patient Sequence [c]	(0008,1120)	2	-	(0008,1120)	(0008,1120)
>Referenced SOP Class UID	(0008,1150)	1C	-		
>Referenced SOP Instance UID	(0008,1155)	1C	-		
Visit Admission					
Referring Physician's Name	(0008,0090)	2	x	(0008,0090)	
Admitting Diagnoses Description	(0008,1080)	3	x	(0008,1080)	
Patient Identification					
Patient's Name	(0010,0010)	1	x	(0010,0010)	(0010,0010)
Patient ID	(0010,0020)	1	x	(0010,0020)	(0010,0020)
Other Patient IDs	(0010,1000)	3	x	(0010,1000)	
Other Patient Names	(0010,1001)	3	x	(0010,1001)	
Patient Demographic					
Patient's Birth Date	(0010,0030)	2	x	(0010,0030)	(0010,0030)
Patient's Sex	(0010,0040)	2	x	(0010,0040)	(0010,0040)
Patient's Size	(0010,1020)	3	x	(0010,1020)	
Patient's Weight	(0010,1030)	2	x	(0010,1030)	
Patient's Address	(0010,1040)	3	x	(0010,1040)	
Military Rank	(0010,1080)	3	x	(0010,1080)	
Ethnic Group	(0010,2160)	3	x	(0010,2160)	
Patient Comments	(0010,4000)	3	x	(0010,4000)	
Patient Data Confidentiality Constraint Description	(0040,3001)	2	-	(0040,3001)	
Patient Medical					
Medical Alerts	(0010,2000)	2	x	(0010,2000)	
Contrast Allergies	(0010,2110)	2	x	(0010,2110)	
Pregnancy Status	(0010,21C0)	2	x	(0010,21C0)	
Smoking Status	(0010,21A0)	3	x	(0010,21A0)	
Last Menstrual Date	(0010,21D0)	3	x	(0010,21D0)	
Additional Patient History	(0010,21B0)	3	x	(0010,21B0)	
Special Needs	(0038,0050)	2	x	(0038,0050)	

[a] Old tag (0040,2006) is retired and not used.
[b] Old tag (0040,2007) is retired and not used.
[c] Uses universal sequence match

Attribute Name	Tag	Return Key Type	UI	IOD	MPPS
Patient State	(0038,0500)	2	x	(0038,0500)	
Patient Relationship					
Referenced Study Sequence [c]	(0008,1110)	3	-		
>Referenced SOP Class UID	(0008,1150)	1C	-		
>Referenced SOP Instance UID	(0008,1155)	1C	-		

11.1.2.1.4 Associated Real-World Activity – Get Worklist

With "Get Worklist" in the patient based Worklist Query dialog, the entered attributes are used to form a worklist request identifier. With the response data the Patient Registration dialog can be updated to register an examination. The response data are additionally placed in the scheduler database

11.1.2.1.5 Proposed Presentation Contexts – Get Worklist

This Real-World Activity will propose the same Presentation Contexts as with “Update Worklist”. Please see table in section 11.1.2.1.2.

11.1.2.1.6 SOP Specific Conformance – Get Worklist

11.1.2.1.6.1 Search Key Attributes of the Worklist C-FIND

The AXIOM Aristos DICOM worklist SCU supports “narrow worklist queries” with all required search keys. The following tables describe the “narrow query” search keys that the SCU supports.

Attribute Name	Tag	Matching Key Type	Query Value
Scheduled Procedure Step			
Scheduled Procedure Step Sequence	(0040,0100)	R	
>Scheduled Performing Physician’s Name	(0040,0006)	R	input from UI or <zero-length>
Requested Procedure			
Requested Procedure ID	(0040,1001)	O	input from UI or <zero-length>
Imaging Service Request			
Accession Number	(0008,0050)	O	input from UI or <zero-length>
Referring Physician’s Name	(0008,0090)	O	input from UI or <zero-length>
Visit Status			
Current Patient Location	(0038,0300)	O	input from UI or <zero-length>
Patient Identification			
Patient’s Name	(0010,0010)	R	input from UI or <zero-length>
Patient ID	(0010,0020)	R	input from UI or <zero-length>

It is configurable to use additionally the search keys from the broad query ("Modality", "Scheduled Station AE Title", "Scheduled Procedure Step Start Date" and "Scheduled Procedure Step Start Time").

11.1.2.1.6.2 Return Key Attributes of the Worklist C-FIND

Same list as for “Update Worklist”. Please see table in section 11.1.2.1.3.2.

11.1.2.1.6.3 Status Codes of the Worklist C-FIND

The worklist SCU interprets following status codes:

Service Status	Meaning	Error Codes	Related Fields
Refused	Out of Resources	A700	(0000,0902)
Failed	Identifier does not match SOP Class	A900	(0000,0901) (0000,0902)
	Unable to process	Cxxx	(0000,0901) (0000,0902)
Cancel	Matching terminated due to Cancel request	FE00	None
Success	Matching is complete - No final Identifier is supplied	0000	None
Pending	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys	FF00	Identifier
	Matches are continuing - Warning that one or more Optional Keys were not supported for existence and/or matching for this identifier	FF01	Identifier

12 Implementation Model MPPS

The Modality Performed Procedure Step Service class defines an application-level class of service that facilitates the transfer of procedure, billing and radiation dose information from the imaging modality to the information system. The Performed Procedure Step is created and set by the AE and supplies the SCP with the information about a real-world procedure that is performed on the modality. The AXIOM Aristos DICOM Modality Performed Procedure Step application supports the MPPS service as SCU.

12.1 Application Data Flow Diagram

The AXIOM Aristos DICOM network implementation acts as SCU for the Modality Performed Procedure Step SOP Class. The product target Operating System is Windows XP.

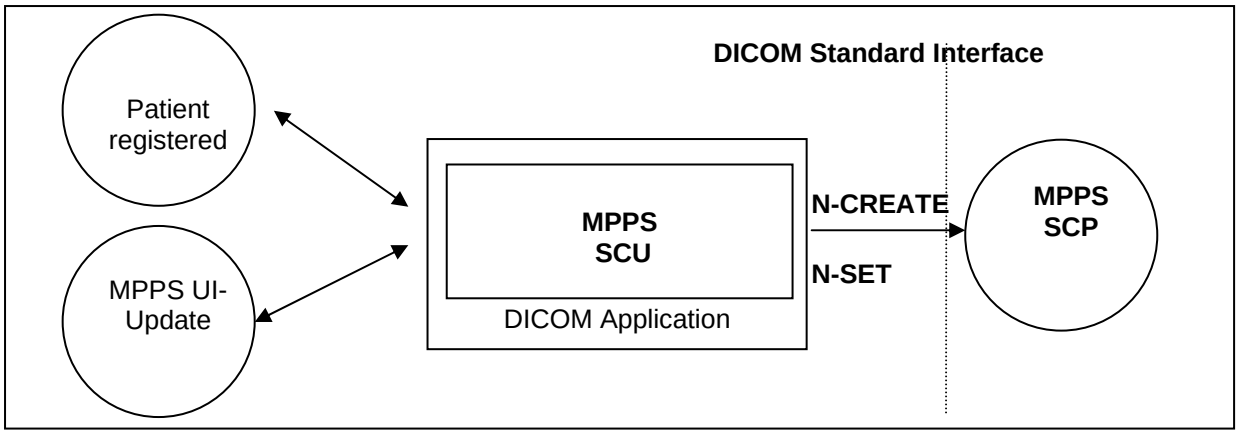


Figure 6: AXIOM Aristos Application Flow Diagram – MPPS SCU

12.2 Functional Definitions of Application Entities

With registering a Patient (i.e. a Scheduled Procedure Step from Worklist), the AXIOM Aristos DICOM application will create a MPPS Instance and communicate it to the MPPS SCP.

It is configurable to set the states of all related MPPS to "Completed" when a patient is closed. Furthermore a manual update can be performed with the AXIOM Aristos MPPS user interface. DICOM application will no longer allow updates on the related MPPS Instance when the state is set to "Completed" or "Discontinued".

The AXIOM Aristos will support creation of “unscheduled cases” by allowing MPPS Instances to be communicated for locally registered Patients.

13 AE Specification MPPS

13.1 Modality Performed Procedure Step AE Specification

The Modality Performed Procedure Step SCU (Patient Registration and MPPS UI) provides information about a performed real-world Procedure to a remote SCP (Information System).

SIEMENS AXIOM Aristos DICOM products provide Standard Conformance to the following DICOM SOP Class as an SCU:

SOP Class Name	SOP Class UID
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3

13.1.1 Association Establishment Policies

13.1.1.1 General

The creation of MPPS Instance is done automatically by AXIOM Aristos whenever a patient is registered for image acquisition through the Patient Registration dialog.

Further updates on the MPPS data can be done interactively from the related MPPS user interface. The MPPS “Complete” or “Discontinued” states can only be set from user interface.

The default PDU size used will be 256 KB.

13.1.1.2 Number of Associations

The AXIOM Aristos DICOM application initiates one association at a time to create or set MPPS instance.

13.1.1.3 Asynchronous Nature

The AXIOM Aristos DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

13.1.1.4 Implementation Identifying Information

Implementation Class UID	1.3.12.2.1107.5.9.20000101
Implementation Version Name	“SIEMENS_SWFVD31A”

13.1.2 Association Initiation Policy

The AXIOM Aristos DICOM Application Entity acts as a Service Class User (SCU) for the

- Modality Performed Procedure Step Service Class (to notify a RIS about status of a procedure while it is performed).

To do so, the AXIOM Aristos will issue a

- N-CREATE DIMSE according to the CREATE Modality Performed Procedure Step SOP Instance operation or a
- N-SET DIMSE to update the contents and state of the MPPS according to the SET Modality Performed Procedure Step Information operation.

13.1.2.1 Real World Activity

13.1.2.1.1 Associated Real-World Activity - Patient registered

A patient is registered by the Patient Registration “Exam” action. From this event the trigger to create a MPPS Instance is derived. The related Instance is then immediately communicated to the configured RIS system. An association is established and the MPPS Instance is sent.

13.1.2.1.2 Proposed Presentation Contexts - Patient registered

The AXIOM Aristos DICOM application will propose Presentation Contexts as shown in the following table:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

13.1.2.1.3 SOP Specific Conformance Statement- Patient registered

13.1.2.1.3.1 Attributes used for the Performed Procedure Step N-CREATE

The Siemens AXIOM Aristos DICOM Modality Performed Procedure Step SCU informs the remote SCP when the examination of a scheduled procedure step will be performed (i.e. the patient is registered). The N-CREATE message is sent when the examination is started with successful registration of the patient data. The following table describes the supported attributes of a N-CREATE message.

Attribute Name	Tag	Type	Value
SOP Common			
Specific Character Set	(0008,0005)	1C	from MWL or created
Performed Procedure Step Relationship			
Scheduled Step Attribute Sequence	(0040,0270)	1	
>Study Instance UID	(0020,000D)	1	from MWL or created
>Referenced Study Sequence	(0008,1110)	2	from MWL or <zero-length>
>>Referenced SOP Class UID	(0008,1150)	1C	
>>Referenced SOP Instance UID	(0008,1155)	1C	
>Accession Number	(0008,0050)	2	from MWL or user input
>Placer Order Number/Imaging Service Request	(0040,2016)	3	from MWL or <zero-length>
>Filler Order Number/Imaging Service Request	(0040,2017)	3	from MWL or <zero-length>
>Requested Procedure ID	(0040,1001)	2	from MWL or user input
>Requested Procedure Description	(0032,1060)	2	from MWL or <zero-length>
>Scheduled Procedure Step ID	(0040,0009)	2	from MWL or <zero-length>
>Scheduled Procedure Step Description	(0040,0007)	2	from MWL or <zero-length>

Attribute Name	Tag	Type	Value
>Scheduled Protocol Code Sequence	(0040,0008)	2	from MWL or <zero-length>
>>Code Value	(0008,0100)	1C	
>>Coding Scheme Designator	(0008,0102)	1C	
>>Coding Scheme Version	(0008,0103)	3	
>>Code Meaning	(0008,0104)	3	
Patient's Name	(0010,0010)	2	from MWL or user input
Patient ID	(0010,0020)	2	from MWL or user input
Patient's Birth Date	(0010,0030)	2	from MWL or user input
Patient's Sex	(0010,0040)	2	from MWL or user input
Referenced Patient Sequence	(0008,1120)	2	from MWL or <zero-length>
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Performed Procedure Step Information			
Performed Procedure Step ID	(0040,0253)	1	From SPS ID or created
Performed Station AE Title	(0040,0241)	1	own AE Title
Performed Station Name	(0040,0242)	2	own hostname
Performed Location	(0040,0243)	2	from SPS location or <zero-length>
Performed Procedure Step Start Date	(0040,0244)	1	created
Performed Procedure Step Start Time	(0040,0245)	1	created
Performed Procedure Step Status	(0040,0252)	1	"IN PROGRESS"
Performed Procedure Step Description	(0040,0254)	2	from SPS Description or <zero-length>
Performed Procedure Type Description	(0040,0255)	2	<zero-length>
Procedure Code Sequence	(0008,1032)	2	from Requested Procedure Code or <zero-length>
>Code Value	(0008,0100)	1C	
>Coding Scheme Designator	(0008,0102)	1C	
>Coding Scheme Version	(0008,0103)	3	
>Code Meaning	(0008,0104)	3	
Performed Procedure Step End Date	(0040,0250)	2	<zero-length>
Performed Procedure Step End Time	(0040,0251)	2	<zero-length>
Comments on the Performed Procedure Steps	(0040,0280)	3	<zero-length>
Image Acquisition Results			
Modality	(0008,0060)	1	CR or DX
Study ID	(0020,0010)	2	from Requested Procedure ID or created
Performed Protocol Code Sequence	(0040,0260)	2	from Scheduled Protocol Code Sequence or <zero-length>
>Code Value	(0008,0100)	1C	
>Coding Scheme Designator	(0008,0102)	1C	
>Coding Scheme Version	(0008,0103)	3	
>Code Meaning	(0008,0104)	3	
Performed Series Sequence	(0040,0340)	2	
>Performing Physician's Name	(0008,1050)	2C	from MWL or user input
>Protocol Name	(0018,1030)	1C	from organ program
>Operator's Name	(0008,1070)	2C	User input
>Series Instance UID	(0020,000E)	1C	created
>Series Description	(0008,103E)	2C	<zero-length>
>Retrieve AE Title	(0008,0054)	2C	<zero-length>
>Referenced Image Sequence	(0008,1140)	2C	<zero-length>
>Referenced Non-Image Composite SOP Instance Sequence	(0040,0220)	2C	<zero-length>
Radiation Dose			
Anatomic Structure, Space or Region Sequence	(0008,2229)	3	<zero-length>
Total Time of Fluoroscopy	(0040,0300)	3	<zero-length>
Total Number of Exposures	(0040,0301)	3	<zero-length>

Attribute Name	Tag	Type	Value
Distance Source to Detector	(0018,1110)	3	<zero-length>
Distance Source to Entrance	(0040,0306)	3	<zero-length>
Entrance Dose	(0040,0302)	3	<zero-length>
Exposed Area	(0040,0303)	3	<zero-length>
Image Area Dose Product	(0018,115E)	3	<zero-length>
Comments on Radiation Dose	(0040,0310)	3	<zero-length>
Billing and Material Management Code			
Billing Procedure Step Sequence	(0040,0320)	3	<zero-length>
Film Consumption Sequence	(0040,0321)	3	
>Number of Films	(2100,0170)	3	<zero-length>
>Medium Type	(2000,0030)	3	<zero-length>
>Film Size ID	(2010,0050)	3	<zero-length>
Billing Supplies and Devices Sequence	(0040,0324)	3	
>Billing Item Sequence	(0040,0296)	3	<zero-length>
>Quantity Sequence	(0040,0293)	3	
>>Quantity	(0040,0294)	3	<zero-length>
>>Measuring Units Sequence	(0040,0295)	3	<zero-length>

13.1.2.1.3.2 Status Codes of the Performed Procedure Step N-CREATE

The Performed Procedure Step SCU interprets following status codes:

Service Status	Meaning	Error Codes (0000.0900)
Failure	Processing Failure	0110
	No such attribute	0105
	Invalid attribute value	0106
	Duplicate SOP Instance	0111
	No such SOP Instance	0112
	No such SOP Class	0118
	Class Instance conflict	0119
	Missing attribute	0120
	Missing attribute value	0121
	Resource limitation	0213
Success	MPPS Instance created	0000

13.1.2.1.4 Associated Real-World Activity – MPPS UI-Update

With the MPPS UI the status of the MPPS Instance can be set to “COMPLETED” or “DISCONTINUED”. There is no cyclic update during performance of the procedure.

13.1.2.1.5 Proposed Presentation Contexts – MPPS UI-Update

This REAL-WORLD ACTIVITY will propose the same Presentation Contexts as with “Patient registered”. Please see table in section 13.1.2.1.2.

13.1.2.1.6 SOP Specific Conformance Statement – MPPS UI-Update

13.1.2.1.6.1 Attributes used for the Performed Procedure Step N-SET

The Siemens AXIOM Aristos DICOM Modality Performed Procedure Step SCU informs the remote SCP about the performed examination and its status. The N-SET message is sent only per ended examination (finished status “COMPLETED” or incomplete status “DISCONTINUED”). The following table describes the supported attributes of a N-SET message.

Attribute Name	Tag	Type	Value
Performed Procedure Step Information			
Performed Procedure Step Status	(0040,0252)	3	"IN PROGRESS", “COMPLETED” or “DISCONTINUED”
Performed Procedure Step Description	(0040,0254)	3	from SPS Description or user input
Procedure Code Sequence	(0008,1032)	3	from Requested Procedure Code
>Code Value	(0008,0100)	1C	
>Coding Scheme Designator	(0008,0102)	1C	
>Coding Scheme Version	(0008,0103)	3	
>Code Meaning	(0008,0104)	3	
Performed Procedure Step End Date	(0040,0250)	1	created
Performed Procedure Step End Time	(0040,0251)	1	created
Image Acquisition Results			
Performed Protocol Code Sequence	(0040,0260)	3	from Scheduled Protocol Code Sequence
>Code Value	(0008,0100)	1C	
>Coding Scheme Designator	(0008,0102)	1C	
>Coding Scheme Version	(0008,0103)	3	
>Code Meaning	(0008,0104)	3	
Performed Series Sequence	(0040,0340)	1	
>Performing Physician’s Name	(0008,1050)	2C	from MWL or user input
>Protocol Name	(0018,1030)	1C	from related SOP Instance
>Operator’s Name	(0008,1070)	2C	user input
>Series Instance UID	(0020,000E)	1C	from related SOP Instance
>Series Description	(0008,103E)	2C	from related SOP Instance
>Retrieve AE Title	(0008,0054)	2C	
>Referenced Image Sequence	(0008,1140)	2C	
>>Referenced SOP Class UID	(0008,1150)	1C	
>>Referenced SOP Instance UID	(0008,1155)	1C	
>Referenced Non-Image Composite SOP Instance Sequence	(0040,0220)	2C	<zero-length>
Radiation Dose			
Total Number of Exposures	(0040,0301)	3	
Distance Source to Detector	(0018,1110)	3	
Image Area Dose Product	(0018,115E)	3	
Billing and Material Management Code			
Film Consumption Sequence	(0040,0321)	3	
>Number of Films	(2100,0170)	3	<zero-length>
>Medium Type	(2000,0030)	3	<zero-length>
>Film Size ID	(2010,0050)	3	<zero-length>

13.1.2.1.6.2 Status Codes of the Performed Procedure Step N-SET

The Performed Procedure Step SCU interprets following status codes:

Service Status	Meaning	Error Codes (0000.0900)
Failure	Processing Failure: Performed Procedure Step Object may no longer be updated.	0110
	No such attribute	0105
	Invalid attribute value	0106
	No such SOP Instance	0112
	Invalid Object instance	0117
	No such SOP Class	0118
	Class Instance conflict	0119
	Missing attribute value	0121
	Resource limitation	0213
Success	MPPS Instance set	0000

14 Communication Profiles

14.1 Supported Communication Stacks

The Siemens AXIOM Aristos DICOM application provides DICOM TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.
The product target Operating System is Windows XP.

14.1.1 TCP/IP Stack

The AXIOM Aristos DICOM application uses the TCP/IP stack from the target operating system upon which it executes. It uses the MergeCOM subroutine library from Merge Technologies Inc. that is based on a Berkeley socket interface.

14.1.1.1 API

The AXIOM Aristos DICOM application uses the MergeCOM library that is based on a TCP/IP socket interface.

14.1.1.2 Physical Media Support

The AXIOM Aristos DICOM application is indifferent to the physical medium over which TCP/IP executes; it inherits this from the target operating system upon which it executes.

15 Extensions / Specializations / Privatizations

15.1.1 Standard Extended / Specialized / Private SOPs

Please refer to Annex for further information on these topics. A detailed overview is given there.

15.1.2 Private Transfer Syntaxes

Not applicable

16 Configuration

16.1 AE Title/Presentation Address Mapping

To ensure unique identification within the network the hostname should be used as part of the AE Titles (see examples below, hostname = name1). The string can be up to 16 characters long and must not contain any extended characters, only 7-bit ASCII characters (excluding Control Characters) are allowed according to DICOM Standard.

Note: the current implementation of syngo does not support the full DICOM Standard. Spaces and special characters (like &<> '') in the AE title string are not supported.

16.1.1 DICOM Verification

The Verification Service uses the AE configuration of the DICOM Service that is checked with the C-ECHO message. e.g. Verification will use the Storage AE, if initiated to check the configuration of a remote DICOM node.

16.1.2 DICOM AE Titles

Within syngo there are local application entity titles for HIS/RIS, Study Transfer and Print. They can be configured via Service-UI in Configuration / DICOM / General (e.g. STU_NAME1).

The own port number of the AXIOM Aristos is set to the fixed value of 104.

16.2 Configurable Parameters

The Application Entity Titles, host names and port numbers for remote AE are configured using the AXIOM Aristos Service/Installation Tool. For each AET the list of services supported can be configured.

16.2.1 Storage and Storage Commitment

The AXIOM Aristos Service/Installation Tool can be used to set the AETs, port-numbers, host-names, IP-addresses and capabilities for the remote nodes (SCPs).

The AXIOM Aristos Service/Installation Tool can be used to configure whether the association will be kept open to receive the Storage Commitment response or to close the association and be prepared to receive the response on another association. A time-out can be configured that defines how long the association of N-ACTION is kept to receive a N-EVENT-REPORT on the same association. The same value is used to wait for a N-EVENT-REPORT on an other association. (default 1 h)

The user can select the compression mode for each SCP separately.

16.2.2 Print

The AXIOM Aristos Service/Installation Tool can be used to configure the SCP (DICOM-Printer).

These parameters are mandatory to set:

- AET

- host-name
- IP-address
- Port-number

These parameters have defaults as per configuration file and can be changed:

- default camera (yes/no)
- pixel size
- additional or changed film sheet formats (e.g. inch 14x14, inch 14x17, ...)
- list with mapping pixel size to each film sheet format
- minimal density
- stored printed film jobs
- media type
- film destination

16.2.3 Modality Worklist

The Service application can be used to set the AETs, port numbers, host names, IP addresses, capabilities and time-outs for the remote nodes (SCPs)**Additional configurable parameters for Modality Worklist Query are:**

- Query Waiting time - the time to wait for the C-FIND-RSP after sending the C-FIND-RQ (default 20 sec.)
- Max Query Match Number - the maximum number of entries accepted in one worklist (default is 200, maximum is 999)
- Query Interval: the time between two C-FIND-RQ to the Hospital Information system (default is 60 min., maximum is 1440 min.)

Broad Worklist Query behavior (two values are defined):

- Set the AE Title search attribute to the own AE Title, and the Modality search attribute to zero-length.
- Set the Modality search attribute to the own modality and the AE Title search attribute to zero-length.

16.3 Default Parameters

This installation tool also uses some default parameters:

- max PDU size set to 262144 Bytes (256 KB)
- time-out for accepting/rejecting an association request: 60 s
- time-out for responding to an association open/close request: 60 s
- time-out for accepting a message over network: 60 s
- time-out for waiting for data between TCP/IP-packets: 60 s

The time-outs for waiting for a Service Request/Response message from the remote node are as follows:

- for Storage SCU: 600 s
- for Storage Commitment SCU, time-out for Response to N-ACTION: 600 s

- time-out for Response to Print Management N-SET-RQ: 240 s
- time-out for Response to other Print Management Requests: 60 s

17 Support of Extended Character Sets

The AXIOM Aristos DICOM application supports the ISO 8859 Latin 1 (ISO-IR 100) character set.

Also the Japanese language character sets JIS X 0201 (ISO-IR 13 Japanese katakana and ISO-IR 14 Japanese romaji), JIS X 0208 (ISO-IR 87 Japanese kanji) and JIS X 0212 (ISO-IR 159 Supplementary Japanese kanji) are supported.

A ANNEX

A.1 SIEMENS Private Non-Image IOD

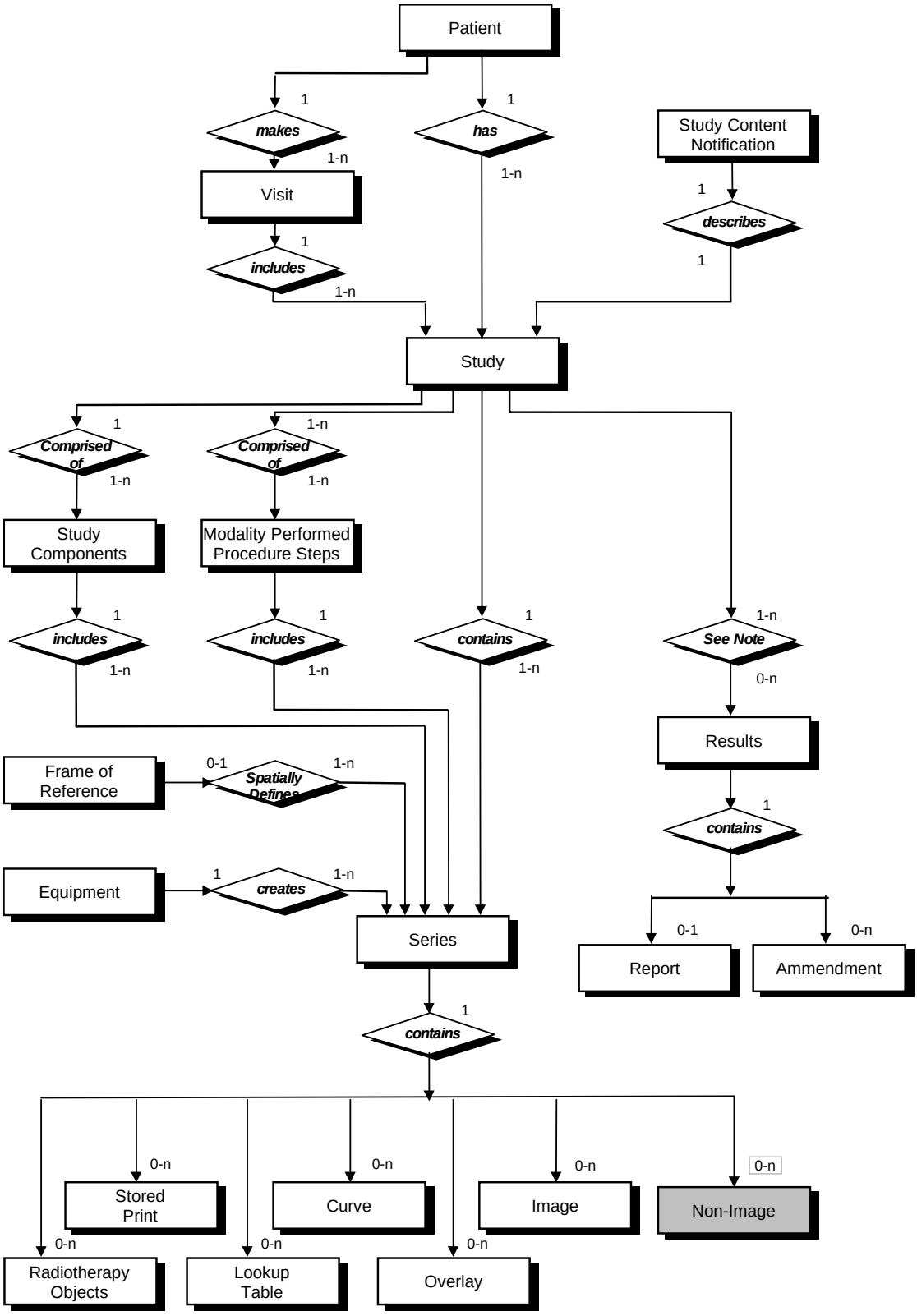
For encoding binary data-streams not representing image data, Siemens has created a private "Non-Image IOD" according to the rules governed by the DICOM Standard. The following section will roll-out the definition of this Private IOD. It can be communicated with Network Storage Service and Offline Media Storage Services.

The Siemens "Non-Image IOD" is identified by a private Non-Image Storage SOP Class UID of

„1.3.12.2.1107.5.9.1"

A.1.1 Siemens Non-Image IOD – E-R Model

The E-R model in A.1.2 depicts those components of the DICOM Information Model that directly refer to the Siemens Non-Image IOD. The Frame of Reference IE, Overlay IE, Modality Lookup-Table IE, VOI Lookup-Table IE and Curve IE are not components of the Siemens Non-Image IOD.


Patient
1
makes
1-n
Visit
1
includes
1-n
1
has
1-n
Study Content Notification
1
describes
1
Study
1
Comprised of
1-n
1-n
Comprised of
1-n
Study Components
Modality Performed Procedure Steps
1
includes
1-n
1
includes
1-n
1
contains
1-n
1-n
See Note
0-n
Results
Frame of Reference
0-1
Spatially Defines
1-n
Equipment
1
creates
1-n
Series
1
contains
1
contains
0-1
Report
0-n
Ammendment
0-n
Stored Print
0-n
Curve
0-n
Image
0-n
Non-Image
0-n
Radiotherapy Objects
0-n
Lookup Table
0-n
Overlay
0-n

A.1.2 Siemens Non-Image IOD - Module Table

IE	Module	Reference	Usage
Patient	Patient	[1] PS3.3 C.7.1.1	M
Study	General Study	[1] PS3.3 C.7.2.1	M
	Patient Study	[1] PS3.3 C.7.2.2	U
Series	General Series	[1] PS3.3 C.7.3.1	M
Equipment	General Equipment	[1] PS3.3 C.7.5.1	U
CSA	CSA Image Header	A.2.1	U
	CSA Series Header	A.2.2	U
	MEDCOM Header	A.2.3	U
	CSA Non-Image	A.1.3.1	M
	SOP Common	[1] PS3.3 C.12.1	M

A.1.3 Siemens Non-Image IOD - Modules

A.1.3.1 CSA Non-Image Module

The table in this section contains private IOD Attributes that describe CSA Non-Images.

Attribute Name	Tag	Owner	Type	Notes
Image Type	(0008,0008)	-	3	Image identification characteristics.
Acquisition Date	(0008,0022)	-	3	The date the acquisition of data that resulted in this data set started.
Acquisition Time	(0008,0032)	-	3	The time the acquisition of data that resulted in this data set started.
Conversion Type	(0008,0064)	-	3	Describes the kind of image conversion. Defined Terms: DV = Digitized Video, DI = Digital Interface, DF = Digitized Film, WSD = Workstation.
Referenced Image Sequence	(0008,1140)	-	3	A sequence which provides reference to a set of Image SOP Class/Instance identifying other images significantly related to this data set. Encoded as sequence of items: (0008,1150) and (0008,1155).
Derivation Description	(0008,2111)	-	3	A text description of how this data set was derived.
Source Image Sequence	(0008,2112)	-	3	A Sequence that identifies the set of Image SOP Class/Instance pairs of the Images that were used to derive this data set. Zero or more Items may be included in this Sequence. Encoded as sequence of items: (0008,1150) and (0008,1155).
Patient Position	(0018,5100)	-	3	Patient position descriptor relative to the equipment.
Acquisition Number	(0020,0012)	-	3	A number identifying the single continuous gathering of data over a period of time which resulted in this data set.
Image Number	(0020,0013)	-	3	A number that identifies this data set.
Frame of Reference UID	(0020,0052)	-	3	Uniquely identifies the frame of reference for a Series.
Image Comments	(0020,4000)	-	3	User-defined comments about the image.
Quality Control Image	(0028,0300)	-	3	Indicates whether or not this image is a quality control or phantom image.

Attribute Name	Tag	Owner	Type	Notes
				If this Attribute is absent, then the image may or may not be a quality control or phantom image. Enumerated Values: YES, NO.
Burned in Annotation	(0028,0301)	-	3	Indicates whether or not image contains sufficient burned in annotation to identify the patient and date the image was acquired. If this Attribute is absent, then the image may or may not contain burned in annotation. Enumerated Values: YES, NO.
Lossy Image Compression	(0028,2110)	-	3	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.
Lossy Image Compression Ratio	(0028,2112)	-	3	Describes the approximate lossy compression ratio(s) that have been applied to this image. May be multi valued if successive lossy compression steps have been applied.
CSA Data Type	(0029,xx08)	SIEMENS CSA NON-IMAGE	1	CSA Data identification characteristics. Defined Terms: BSR REPORT = Exam Protocol Data of Artis RADIS REPORT = Exam Protocol Data of Aristos 3D EDITOR 3D FLY PATH = Fly Through Data 3D FLY VRT = Fly Through Data 3D FUSION MATRIX = Fusion Data RAW DATA NUM 4 = NUMARIS/ Raw Data RAW DATA SOM 5 = SOMARIS/ Raw Data RT3D CONFIG = InSpaceIS Data SPEC NUM 4 = NUMARIS/4 Spectroscopy
CSA Data Version	(0029,xx09)	SIEMENS CSA NON-IMAGE	3	Version of CSA Data Info (0029,xx10) format and CSA Non-Image Data (7FE1,xx10) format.
CSA Data Info	(0029,xx10)	SIEMENS CSA NON-IMAGE	3	Information to describe the CSA Data (7FE1,xx10).
CSA Data	(7FE1,xx10)	SIEMENS CSA NON-IMAGE	2	Binary data as byte stream.

A.2 Siemens Standard Extended Modules

IE	Module	Reference	Usage	Note
Image	CSA Image Header Module	A.2.1	U	private GG information
	CSA Series Header Module	A.2.2	U	
	MEDCOM Header Module	A.2.3	U	private *syngo* information
	MEDCOM OOG Module	A.2.4	U	if object graphics is attached to image
	Aristos FD Lab Settings	A.2.5	U	
	Aristos FD Processing Settings	A.2.6	U	
	Aristos FD Raw Image Settings Module	A.2.7	U	

A.2.1 CSA Image Header Module

The table in this section contains private IOD Attributes that describe the CSA Image Header:

Attribute Name	Tag	Owner	Type	Notes
CSA Image Header Type	(0029,xx08)	SIEMENS CSA HEADER	1	CSA Image Header identification characteristics. Defined Terms: NUM 4 = NUMARIS/4 SOM 5 = SOMARIS/5
CSA Image Header Version	(0029,xx09)	SIEMENS CSA HEADER	3	Version of CSA Image Header Info (0029,xx10) format.
CSA Image Header Info	(0029,xx10)	SIEMENS CSA HEADER	3	Manufacturer model dependent information.

A.2.2 CSA Series Header Module

The table in this section contains private IOD Attributes that describe the CSA Series Header:

Attribute Name	Tag	Owner	Type	Notes
CSA Series Header Type	(0029,xx18)	SIEMENS CSA HEADER	1	CSA Series Header identification characteristics. Defined Terms: NUM 4 = NUMARIS/4
CSA Series Header Version	(0029,xx19)	SIEMENS CSA HEADER	3	Version of CSA Series Header Info (0029,xx20) format.
CSA Series Header Info	(0029,xx20)	SIEMENS CSA HEADER	3	Manufacturer model dependent information.

A.2.3 MEDCOM Header Module

The table in this section contains private IOD Attributes that describe MEDCOM Header:

Attribute Name	Tag	Owner	Type	Notes
MedCom Header Type	(0029,xx08)	SIEMENS MEDCOM HEADER	1C	MedCom Header identification characteristics. Defined Terms: MEDCOM 1 (Required if MedCom Header Info (0029,xx10) present.)
MedCom Header Version	(0029,xx09)	SIEMENS MEDCOM HEADER	2C	Version of MedCom Header Info (0029,xx10) format. (Required if MEDCOM Header Info (0029,xx10) present.)
MedCom Header Info	(0029,xx10)	SIEMENS MEDCOM HEADER	3	Manufacturer model dependent information.

Attribute Name	Tag	Owner	Type	Notes
				The value of the attribute MedCom Header Info (0029,xx10) can be build up in each user defined format.
MedCom History Information	(0029,xx20)	SIEMENS MEDCOM HEADER	3	MedCom defined Patient Registration history information. See A.2.3.1.
PMTF Information 1	(0029,xx31)	SIEMENS MEDCOM HEADER	3	Transformation Information
PMTF Information 2	(0029,xx32)	SIEMENS MEDCOM HEADER	3	Transformation Information
PMTF Information 3	(0029,xx33)	SIEMENS MEDCOM HEADER	3	Transformation Information
PMTF Information 4	(0029,xx34)	SIEMENS MEDCOM HEADER	3	Transformation Information
PMTF Information 5	(0029,xx35)	SIEMENS MEDCOM HEADER	3	Transformation Information
Application Header Sequence	(0029,xx40)	SIEMENS MEDCOM HEADER	3	Sequence of Application Header items. Zero or more items are possible.
>Application Header Type	(0029,xx41)	SIEMENS MEDCOM HEADER	1C	Application Header identification characteristics. Required, if Sequence is sent.
>Application Header ID	(0029,xx42)	SIEMENS MEDCOM HEADER	3	Identification of an application header
>Application Header Version	(0029,xx43)	SIEMENS MEDCOM HEADER	3	Version of CSA Series Header Info (0029,xx44) format.
>Application Header Info	(0029,xx44)	SIEMENS MEDCOM HEADER	3	Application dependent information.
Workflow Control Flags	(0029,xx50)	SIEMENS MEDCOM HEADER	3	Eight free definable flags.
Archive Management Flag Keep Online	(0029,xx51)	SIEMENS MEDCOM HEADER	3	Flag to control remote archive management system to keep the image always online (also when already archived). Enumerated Values: 00 = remote control not required 01 = keep image online
Archive Management Flag Do Not Archive	(0029,xx52)	SIEMENS MEDCOM HEADER	3	Flag to control remote archive management system not to archive the related image. Enumerated Values: 00 = remote control not required 01 = don't archive image
Image Location Status	(0029,xx53)	SIEMENS MEDCOM HEADER	3	Image location status to control retrieving. Defined Terms: ONLINE = retrieving has to be done as usual, NEARLINE = move request to SCP and delay according to value of Estimated Retrieve Time (0029,xx54), OFFLINE = invoking a retrieve operation initiates an operator request, INVALID = invoking a retrieve operation would always result in an error.
Estimated Retrieve Time	(0029,xx54)	SIEMENS MEDCOM HEADER	3	Estimated retrieve time in seconds. A value less then zero (< 0) indicates location is OFFLINE or INVALID.
Data Size of Retrieved Images	(0029,xx55)	SIEMENS MEDCOM HEADER	3	Data size of images in MB
Series Workflow Status	(0029,xx60)	SIEMENS MEDCOM HEADER2	3	

A.2.3.1 MEDCOM History Information

The value of the attribute MEDCOM History Information (0029,xx20) is defined in the following way:

Part	Name	Type	Bytes	Notes
header	Identifier	string	32	Always “CSA HISTORY”
	Version	string	32	e.g. “V1.10”
n Items	Class Name	string	64	
	Modification String	string	1024	

A.2.4 MEDCOM OOG Module

The table in this section contains private IOD Attributes that describe MEDCOM Object Oriented Graphics (OOG). This module is used whenever object graphics is drawn on the image and need to be stored as graphic object properties. Given the condition that the module contents was not removed by other modalities, the graphic objects remain re-animatable if such an image was transferred and is then retrieved back

Attribute Name	Tag	Owner	Type	Notes
MedCom OOG Type	(0029,xx08)	SIEMENS MEDCOM OOG	1	MEDCOM Object Oriented Graphics (OOG) identification characteristics. Defined Terms: MEDCOM OOG 1 MEDCOM OOG 2
MedCom OOG Version	(0029,xx09)	SIEMENS MEDCOM OOG	3	Version of MEDCOM OOG Info (0029,xx10) format.
MedCom OOG Info	(0029,xx10)	SIEMENS MEDCOM OOG	3	MEDCOM Object Oriented Graphics (OOG) data.

The graphics objects are also fully drawn in the Image Overlay Plane for compatibility with other products, which do not support the MedCom OOG module. Any system not supporting the MedCom OOG module shall remove the OOG module and it’s contents when modifying the image overlay plane content.

A.2.5 Aristos FD Lab Settings

The table in this section contains private IOD Attributes that give information about system settings.

Attribute Name	Tag	Owner	Type	Notes
Internal Value	(0019,xx00)	Siemens: Thorax/Multix FD Lab Settings	3	
Total Area Dose Product	(0019,xx02)	Siemens: Thorax/Multix FD Lab Settings	3	in µGy * m^2 only for CR IOD
Cassette Image	(0019,xx05)	Siemens: Thorax/Multix FD Lab Settings	3	
Table Object Distance	(0019,xx06)	Siemens: Thorax/Multix FD Lab Settings	3	in mm
Table Detector Distance	(0019,xx07)	Siemens: Thorax/Multix FD Lab Settings	3	in mm
Ortho Step Distance	(0019,xx08)	Siemens: Thorax/Multix FD Lab Settings	3	Distance to previous step of ortho series in 0.1 mm.

A.2.6 Aristos FD Processing Settings

The table in this section contains private IOD Attributes that give information about processing settings.

Attribute Name	Tag	Owner	Type	Notes
Label Left	(0021,xx00)	Siemens: Thorax/Multix FD Post Processing	3	Enumerated Values: {0,1}
Label Left Orientation	(0021,xx01)	Siemens: Thorax/Multix FD Lab Settings	3	
Label Left Percentage X	(0021,xx02)	Siemens: Thorax/Multix FD Lab Settings	3	
Label Left Percentage X	(0021,xx03)	Siemens: Thorax/Multix FD Lab Settings	3	
Label Right	(0021,xx04)	Siemens: Thorax/Multix FD Lab Settings	3	Enumerated Values: {0,1}
Label Right Orientation	(0021,xx01)	Siemens: Thorax/Multix FD Lab Settings	3	
Label Right Percentage X	(0021,xx06)	Siemens: Thorax/Multix FD Lab Settings	3	
Label Right Percentage X	(0021,xx07)	Siemens: Thorax/Multix FD Lab Settings	3	
Auto Window Flag	(0021,xx08)	Siemens: Thorax/Multix FD Lab Settings	3	
Auto Window Center	(0021,xx09)	Siemens: Thorax/Multix FD Lab Settings	3	
Auto Window Width	(0021,xx0A)	Siemens: Thorax/Multix FD Lab Settings	3	
Filter ID	(0021,xx0B)	Siemens: Thorax/Multix FD Lab Settings	3	Defined Terms: { 0, 1, 2, 3, 4, 5, 6 }
Degree of Edge Enhancement	(0021,xx0C)	Siemens: Thorax/Multix FD Lab Settings	3	
Half Kernel Size	(0021,xx0D)	Siemens: Thorax/Multix FD Lab Settings	3	
Dose Control Value	(0021,xx0E)	Siemens: Thorax/Multix FD Lab Settings	3	Exposure Index (EXI) only for CR IOD
Deleted Image Flag	(0021,xx0F)	Siemens: Thorax/Multix FD Lab Settings	3	
Same Size Support	(0021,xx10)	Siemens: Thorax/Multix FD Lab Settings	3	
Label Left Init Position	(0021,xx11)	Siemens: Thorax/Multix FD Lab Settings	3	
Label Right Init Position	(0021,xx12)	Siemens: Thorax/Multix FD Lab Settings	3	
Patient Rotation	(0021,xx13)	Siemens: Thorax/Multix FD Lab Settings	3	
Anatomic Correct View Flag	(0021,xx14)	Siemens: Thorax/Multix FD Lab Settings	3	
Auto Window Shift	(0021,xx15)	Siemens: Thorax/Multix FD Lab Settings	3	Offset added to calculated auto window center
Auto Window Expansion	(0021,xx16)	Siemens: Thorax/Multix FD Lab Settings	3	Factor multiplied with calculated auto window width
Exposure Technique	(0021,xx17)	Siemens: Thorax/Multix FD Lab Settings	3	

A.2.7 Aristos FD Raw Image Settings Module

The table in this section contains private IOD Attributes that give information about the version.

Attribute Name	Tag	Owner	Type	Notes
Raw Image Amplification	(0025,xx00)	Siemens: Thorax/Multix FD Raw Image Settings	3	
Gamma LUT	(0025,xx01)	Siemens: Thorax/Multix FD Raw Image Settings	3	
Collimator Manual	(0025,xx02)	Siemens: Thorax/Multix FD Raw Image Settings	3	
Collimator Up Left X Percentage	(0025,xx03)	Siemens: Thorax/Multix FD Raw Image Settings	3	Percentage offset from 3K x 3K image
Collimator Up Right X Percentage	(0025,xx04)	Siemens: Thorax/Multix FD Raw Image Settings	3	Percentage offset from 3K x 3K image
Collimator Low Left X Percentage	(0025,xx05)	Siemens: Thorax/Multix FD Raw Image Settings	3	Percentage offset from 3K x 3K image
Collimator Low Right X Percentage	(0025,xx06)	Siemens: Thorax/Multix FD Raw Image Settings	3	Percentage offset from 3K x 3K image

Attribute Name	Tag	Owner	Type	Notes
Collimator Up Left Y Percentage	(0025,xx07)	Siemens: Thorax/Multix FD Raw Image Settings	3	Percentage offset from 3K x 3K image
Collimator Up Right Y Percentage	(0025,xx08)	Siemens: Thorax/Multix FD Raw Image Settings	3	Percentage offset from 3K x 3K image
Collimator Low Left Y Percentage	(0025,xx09)	Siemens: Thorax/Multix FD Raw Image Settings	3	Percentage offset from 3K x 3K image
Collimator Low Right Y Percentage	(0025,xx0A)	Siemens: Thorax/Multix FD Raw Image Settings	3	Percentage offset from 3K x 3K image
Set Gray	(0025,xx0B)	Siemens: Thorax/Multix FD Raw Image Settings	3	Enumerated Values: {0,1}
Harmonization Kernel	(0025,xx0C)	Siemens: Thorax/Multix FD Raw Image Settings	3	
Harmonization Gain	(0025,xx0D)	Siemens: Thorax/Multix FD Raw Image Settings	3	
Edge Enhancement Kernel	(0025,xx0E)	Siemens: Thorax/Multix FD Raw Image Settings	3	
Edge Enhancement Gain	(0025,xx0F)	Siemens: Thorax/Multix FD Raw Image Settings	3	
Raw Image File Name	(0025,xx10)	Siemens: Thorax/Multix FD Raw Image Settings	3	
Global Offset	(0025,xx11)	Siemens: Thorax/Multix FD Raw Image Settings	3	
Image Columns	(0025,xx12)	Siemens: Thorax/Multix FD Raw Image Settings	3	
Image Rows	(0025,xx13)	Siemens: Thorax/Multix FD Raw Image Settings	3	
Image Alignment	(0025,xx14)	Siemens: Thorax/Multix FD Raw Image Settings	3	
Active Image Columns	(0025,xx15)	Siemens: Thorax/Multix FD Raw Image Settings	3	
Active Image Rows	(0025,xx16)	Siemens: Thorax/Multix FD Raw Image Settings	3	
System Type	(0025,xx17)	Siemens: Thorax/Multix FD Raw Image Settings	3	
Auto Gain	(0025,xx18)	Siemens: Thorax/Multix FD Raw Image Settings	3	
Ortho Sub Sampling	(0025,xx19)	Siemens: Thorax/Multix FD Raw Image Settings	3	

A.3 Registry of DICOM Data Elements

Tag	Private Owner Code	Name	VR	VM
(0019,xx02)	Siemens: Thorax/Multix FD Lab Settings	Total Area Dose Product	LO	1
(0019,xx05)	Siemens: Thorax/Multix FD Lab Settings	Cassette Image	US	1
(0019,xx06)	Siemens: Thorax/Multix FD Lab Settings	Table Object Distance	FD	1
(0019,xx07)	Siemens: Thorax/Multix FD Lab Settings	Table Detector Distance	FD	1
(0019,xx08)	Siemens: Thorax/Multix FD Lab Settings	Ortho Step Distance	US	1
(0021,xx00)	Siemens: Thorax/Multix FD Post Processing	Label Left	US	1
(0021,xx01)	Siemens: Thorax/Multix FD Lab Settings	Label Left Orientation	SS	1
(0021,xx02)	Siemens: Thorax/Multix FD Lab Settings	Label Left Percentage X	FL	1
(0021,xx03)	Siemens: Thorax/Multix FD Lab Settings	Label Left Percentage X	FL	1
(0021,xx04)	Siemens: Thorax/Multix FD Lab Settings	Label Right	US	1
(0021,xx05)	Siemens: Thorax/Multix FD Lab Settings	Label Right Orientation	SS	1
(0021,xx06)	Siemens: Thorax/Multix FD Lab Settings	Label Right Percentage X	FL	1
(0021,xx07)	Siemens: Thorax/Multix FD Lab Settings	Label Right Percentage X	FL	1
(0021,xx08)	Siemens: Thorax/Multix FD Lab Settings	Auto Window Flag	US	1
(0021,xx09)	Siemens: Thorax/Multix FD Lab Settings	Auto Window Center	SL	1
(0021,xx0A)	Siemens: Thorax/Multix FD Lab Settings	Auto Window Width	SL	1
(0021,xx0B)	Siemens: Thorax/Multix FD Lab Settings	Filter ID	SS	1
(0021,xx0C)	Siemens: Thorax/Multix FD Lab Settings	Degree of Edge Enhancement	FL	1
(0021,xx0D)	Siemens: Thorax/Multix FD Lab Settings	Half Kernel Size	SS	1
(0021,xx0E)	Siemens: Thorax/Multix FD Lab Settings	Dose Control Value	US	1
(0021,xx0F)	Siemens: Thorax/Multix FD Lab Settings	Deleted Image Flag	US	1
(0021,xx10)	Siemens: Thorax/Multix FD Lab Settings	Same Size Support	US	1
(0021,xx11)	Siemens: Thorax/Multix FD Lab Settings	Label Left Init Position	SS	1
(0021,xx12)	Siemens: Thorax/Multix FD Lab Settings	Label Right Init Position	SS	1
(0021,xx13)	Siemens: Thorax/Multix FD Lab Settings	Patient Rotation	SS	1
(0021,xx14)	Siemens: Thorax/Multix FD Lab Settings	Anatomic Correct View Flag	US	1
(0021,xx15)	Siemens: Thorax/Multix FD Lab Settings	Auto Window Shift	SS	1
(0021,xx16)	Siemens: Thorax/Multix FD Lab Settings	Auto Window Expansion	DS	1
(0025,xx00)	Siemens: Thorax/Multix FD Raw Image Settings	Raw Image Amplification	SS	1
(0025,xx01)	Siemens: Thorax/Multix FD Raw Image Settings	Gamma LUT	SS	1
(0025,xx02)	Siemens: Thorax/Multix FD Raw Image Settings	Collimator Manual	US	1
(0025,xx03)	Siemens: Thorax/Multix FD Raw Image Settings	Collimator Up Left X Percentage	FL	1
(0025,xx04)	Siemens: Thorax/Multix FD Raw Image Settings	Collimator Up Right X Percentage	FL	1
(0025,xx05)	Siemens: Thorax/Multix FD Raw	Collimator Low Left X Percentage	FL	1

Tag	Private Owner Code	Name	VR	VM
	Image Settings			
(0025,xx06)	Siemens: Thorax/Multix FD Raw Image Settings	Collimator Low Right X Percentage	FL	1
(0025,xx07)	Siemens: Thorax/Multix FD Raw Image Settings	Collimator Up Left Y Percentage	FL	1
(0025,xx08)	Siemens: Thorax/Multix FD Raw Image Settings	Collimator Up Right Y Percentage	FL	1
(0025,xx09)	Siemens: Thorax/Multix FD Raw Image Settings	Collimator Low Left Y Percentage	FL	1
(0025,xx0A)	Siemens: Thorax/Multix FD Raw Image Settings	Collimator Low Right Y Percentage	FL	1
(0025,xx0B)	Siemens: Thorax/Multix FD Raw Image Settings	Set Gray	US	1
(0025,xx0C)	Siemens: Thorax/Multix FD Raw Image Settings	Harmonization Kernel	SS	1
(0025,xx0D)	Siemens: Thorax/Multix FD Raw Image Settings	Harmonization Gain	FL	1
(0025,xx0E)	Siemens: Thorax/Multix FD Raw Image Settings	Edge Enhancement Kernel	SS	1
(0025,xx0F)	Siemens: Thorax/Multix FD Raw Image Settings	Edge Enhancement Gain	FL	1
(0025,xx10)	Siemens: Thorax/Multix FD Raw Image Settings	Raw Image File Name	LT	1
(0025,xx11)	Siemens: Thorax/Multix FD Raw Image Settings	Global Offset	SS	1
(0025,xx12)	Siemens: Thorax/Multix FD Raw Image Settings	Image Columns	SS	1
(0025,xx13)	Siemens: Thorax/Multix FD Raw Image Settings	Image Rows	SS	1
(0025,xx14)	Siemens: Thorax/Multix FD Raw Image Settings	Image Alignment	SS	1
(0025,xx15)	Siemens: Thorax/Multix FD Raw Image Settings	Active Image Columns	SS	1
(0025,xx16)	Siemens: Thorax/Multix FD Raw Image Settings	Active Image Rows	SS	1
(0025,xx17)	Siemens: Thorax/Multix FD Raw Image Settings	System Type	LO	1
(0025,xx18)	Siemens: Thorax/Multix FD Raw Image Settings	Auto Gain	US	1
(0025,xx19)	Siemens: Thorax/Multix FD Raw Image Settings	Ortho Sub Sampling	US	1
(0029,xx08)	SIEMENS CSA NON-IMAGE	CSA Data Type	CS	1
(0029,xx09)	SIEMENS CSA NON-IMAGE	CSA Data Version	LO	1
(0029,xx10)	SIEMENS CSA NON-IMAGE	CSA Data Info	OB	1
(0029,xx08)	SIEMENS CSA HEADER	CSA Image Header Type	CS	1
(0029,xx09)	SIEMENS CSA HEADER	CSA Image Header Version	LO	1
(0029,xx10)	SIEMENS CSA HEADER	CSA Image Header Info	OB	1
(0029,xx18)	SIEMENS CSA HEADER	CSA Series Header Type	CS	1
(0029,xx19)	SIEMENS CSA HEADER	CSA Series Header Version	LO	1
(0029,xx20)	SIEMENS CSA HEADER	CSA Series Header Info	OB	1
(0029,xx08)	SIEMENS MEDCOM HEADER	MedCom Header Type	CS	1
(0029,xx09)	SIEMENS MEDCOM HEADER	MedCom Header Version	LO	1
(0029,xx10)	SIEMENS MEDCOM HEADER	MedCom Header Info	OB	1
(0029,xx20)	SIEMENS MEDCOM HEADER	MedCom History Information	OB	1
(0029,xx31)	SIEMENS MEDCOM HEADER	PMTF Information 1	LO	1
(0029,xx32)	SIEMENS MEDCOM HEADER	PMTF Information 2	UL	1
(0029,xx33)	SIEMENS MEDCOM HEADER	PMTF Information 3	UL	1
(0029,xx34)	SIEMENS MEDCOM HEADER	PMTF Information 4	CS	1
(0029,xx35)	SIEMENS MEDCOM HEADER	PMTF Information 5	UL	1
(0029,xx40)	SIEMENS MEDCOM HEADER	Application Header Sequence	SQ	1
(0029,xx41)	SIEMENS MEDCOM HEADER	Application Header Type	CS	1
(0029,xx42)	SIEMENS MEDCOM HEADER	Application Header ID	LO	1
(0029,xx43)	SIEMENS MEDCOM HEADER	Application Header Version	LO	1

Tag	Private Owner Code	Name	VR	VM
(0029,xx44)	SIEMENS MEDCOM HEADER	Application Header Info	OB	1
(0029,xx50)	SIEMENS MEDCOM HEADER	Workflow Control Flags	LO	8
(0029,xx51)	SIEMENS MEDCOM HEADER	Arch. Management Flag Keep Online	CS	1
(0029,xx52)	SIEMENS MEDCOM HEADER	Arch. Mgmnt Flag Do Not Archive	CS	1
(0029,xx53)	SIEMENS MEDCOM HEADER	Image Location Status	CS	1
(0029,xx54)	SIEMENS MEDCOM HEADER	Estimated Retrieve Time	DS	1
(0029,xx55)	SIEMENS MEDCOM HEADER	Data Size of Retrieved Images	DS	1
(0029,xx60)	SIEMENS MEDCOM HEADER2	Series Workflow Status	LO	1
(0029,xx08)	SIEMENS MEDCOM OOG	MedCom OOG Type	CS	1
(0029,xx09)	SIEMENS MEDCOM OOG	MedCom OOG Version	LO	1
(0029,xx10)	SIEMENS MEDCOM OOG	MedCom OOG Info	OB	1
(7FE1,xx10)	SIEMENS CSA NON-IMAGE	CSA Data	OB	1

A.4 Standard Extensions of all SOP Classes

The following tables list the data dictionary of all DICOM IOD attributes where the DICOM standard definitions are extended:

Attribute Name	Tag	Private Creator	Type	Notes
Image Type	(0008,0008)	-	1	see A.4.1 additional Defined Terms: Defined Terms for value 4: EXAM PROTOCOL ORTHO TOMO
Patient Position	(0018,5100)	-	2C	see A.4.2 HLS HLP FLS FLP HLDL HLDR FLDL FLDR

All SOP classes may contain additional type 3 attributes that DICOM standard defines in a different DICOM IOD or DICOM SOP class (attributes from Normalized SOP classes). The "Computed Radiography Image Storage SOP Class" contains attributes that the DICOM standard defines in the "Digital X-Ray Image Storage - For Presentation SOP Class"

Examples:

- Date / Time of Last Detector Calibration (0018,700C) / (0018,700E)
- Detector Temperature (0018,7001)
- Image Area Dose Product (0018,115E)

A.4.1 Image Type

The Image Type (0008,0008) attribute identifies important image identification characteristics.

Value 1 shall identify the Pixel Data Characteristics; Enumerated Values for the Pixel Data Characteristics are:

- ORIGINAL = identifies an Original Image
- DERIVED = identifies a Derived Image (e.g. flipped, rotated etc.)

Value 2 shall identify the Patient Examination Characteristics; Enumerated Values for the Patient Examination Characteristics are:

- PRIMARY = identifies a Primary Image
- SECONDARY = identifies a Secondary Image (e.g. flipped, rotated etc.)

Value 3 shall identify any Image IOD specific specialization: not used

Value 4 that is implementation specific, the following terms are defined in addition to the DICOM standard definitions:

- ORTHO = identifies images acquired during an ortho stepping acquisition
- TOMO = identifies images acquired during an tomography acquisition
- CSA RESAMPLED = identifies images that were flipped or rotated

Value 5 that is implementation specific, the following term is used in addition to the DICOM standard definitions:

- EXAM PROTOCOL = identifies the Aristos Non-Image object

A.4.2 Patient Position

The Patient Position attribute (0018,5100) defines the patient position relative to the equipment.

The Defined Terms for this value were extended for the AXIOM Aristos. Here there are additional possibilities to position the patient towards the imaging equipment (i.e. detector).

the new values are:

- HLS (Head left - Supine)
- HLP (Head left - Prone)
- FLS (Feet left - Supine)
- FLP (Feet left - Prone)
- HLDL (Head left - Decubitus left)
- HLDR (Head left - Decubitus right)
- FLDL (Feet left - Decubitus left)
- FLDR (Feet left - Decubitus right)

A.4.3 Pixel Spacing

For support of legacy systems it is supported to copy the value of "Imager Pixel Spacing" (0018,1164) into the tag " Pixel Spacing" (0028,0030) (Configurable in the service tool).

It should be considered that "Pixel Spacing" is only defined for image IODs using the Image Plane Module. When this tag is used within the AXIOM Aristos the user has to consider a magnification factor due to the X-Ray projection.

A.5 Computed Radiography Image Storage Standard Extended SOP Class

The AXIOM Aristos Workstation will create images encoded as CR Standard extended SOP Class. Please see the following table for complete overview of supplied Type 1/2/3 Standard and Private attributes:

"overview of supplied attributes – CR image"

Attribute Name	Tag	Value
Specific Character Set	(0008,0005)	(conf. Character Set is added, if needed)
Image Type	(0008,0008)	see A.4.1
SOP Class UID	(0008,0016)	1.2.840.10008.5.1.4.1.1.1
SOP Instance UID	(0008,0018)	
Study Date	(0008,0020)	
Series Date	(0008,0021)	
Acquisition Date	(0008,0022)	
Content Date	(0008,0023)	
Study Time	(0008,0030)	
Series Time	(0008,0031)	
Acquisition Time	(0008,0032)	
Content Time	(0008,0033)	
Accession Number	(0008,0050)	from MWL or user input
Modality	(0008,0060)	"CR"
Manufacturer	(0008,0070)	"SIEMENS"
Institution Name	(0008,0080)	from MWL, configuration or user input
Institution Address	(0008,0081)	from MWL
Referring Physician's Name	(0008,0090)	from MWL or user input
Station Name	(0008,1010)	from system configuration
Study Description	(0008,1030)	
Procedure Code Sequence	(0008,1032)	from MWL
>Code Value	(0008,0100)	
>Coding Scheme Designator	(0008,0102)	
>Coding Scheme Version	(0008,0103)	
>Code Meaning	(0008,0104)	
Series Description	(0008,103E)	organ program name
Physician(s) of Record	(0008,1048)	from MWL
Performing Physician's Name	(0008,1050)	from MWL or user input
Operator's Name	(0008,1070)	from user input
Admitting Diagnoses Description	(0008,1080)	from MWL or user input
Manufacturer's Model Name	(0008,1090)	"SIEMENS FD-X"
Referenced Study Sequence	(0008,1110)	from MWL
>Referenced SOP Class UID	(0008,1150)	
>Referenced SOP Instance UID	(0008,1155)	
Referenced Procedure Step Sequence	(0008,1111)	reference to MPPS
>Referenced SOP Class UID	(0008,1150)	
>Referenced SOP Instance UID	(0008,1155)	
Referenced Patient Sequence	(0008,1120)	from MWL
>Referenced SOP Class UID	(0008,1150)	
>Referenced SOP Instance UID	(0008,1155)	
Derivation Description	(0008,2111)	info about flip and rotate
Patient's Name	(0010,0010)	from MWL or user input
Patient ID	(0010,0020)	from MWL or user input
Patient's Birth Date	(0010,0030)	from MWL or user input
Patient's Sex	(0010,0040)	from MWL or user input

Attribute Name	Tag	Value
Other Patient IDs	(0010,1000)	from MWL
Other Patient Names	(0010,1001)	from MWL
Patient's Age	(0010,1010)	calculated from (0010,0030) or user input
Patient's Size	(0010,1020)	from MWL or user input
Patient's Weight	(0010,1030)	from MWL or user input
Patient's Address	(0010,1040)	from MWL or user input
Military Rank	(0010,1080)	from MWL or user input
Medical Alerts	(0010,2000)	from MWL
Contrast Allergies	(0010,2110)	from MWL
Ethnic Group	(0010,2160)	from MWL or user input
Smoking Status	(0010,21A0)	from MWL
Additional Patient History	(0010,21B0)	from MWL
Pregnancy Status	(0010,21C0)	from MWL
Last Menstrual Date	(0010,21D0)	from MWL
Patient Comments	(0010,4000)	from MWL or user input
Body Part Examined	(0018,0015)	from OGP description, zero-length if not present
KVP	(0018,0060)	
Device Serial Number	(0018,1000)	from configuration
Plate ID	(0018,1004)	Detector Data: - Factory Serial Number - Factory Date Code - Configuration Version - Factory Part Number
Software Version (s)	(0018,1020)	
Protocol Name	(0018,1030)	same as "Series Description"
Distance Source to Detector	(0018,1110)	
Distance Source to Patient	(0018,1111)	only if anatomic measurement is activated
Exposure Time	(0018,1150)	
X-Ray Tube Current	(0018,1151)	
Exposure	(0018,1152)	
Exposure in µAs	(0018,1153)	
Image Area Dose Product	(0018,115E)	
Filter Type	(0018,1160)	"NONE" or "CU_0.1_MM" or "CU_0.2_MM" or "CU_0.3_MM"
Imager Pixel Spacing	(0018,1164)	"0.143", "0.143 "
Grid	(0018,1166)	"NONE" or "FOCUSED"
Collimator/grid Name	(0018,1180)	
Date of Last Calibration	(0018,1200)	
Acquisition Device Processing Description	(0018,1400)	Diamond View Description
Acquisition Device Processing Code	(0018,1401)	Diamond View Code
Relative X-Ray Exposure	(0018,1405)	EXI value
Tomo Layer Height	(0018,1460)	only for Tomography
Tomo Angle	(0018,1470)	only for Tomography
Tomo Time	(0018,1480)	only for Tomography
Patient Position	(0018,5100)	see A.4.2
View Position	(0018,5101)	
Sensitivity	(0018,6000)	
Detector Conditions Nominal Flag	(0018,7000)	
Detector Temperature	(0018,7001)	
Date of Last Detector Calibration	(0018,700C)	same as "Date of Last Calibration"
Time of Last Detector Calibration	(0018,700E)	
Grid Focal Distance	(0018,704C)	"1150" or "1500" or "1800" or "3000"
Private Data	(0019,xxxx)	see A.2.5
Study Instance UID	(0020,000D)	from MWL or created by system
Series Instance UID	(0020,000E)	created by system

Attribute Name	Tag	Value
Study ID	(0020,0010)	from MWL or created by system
Series Number	(0020,0011)	unique within patient (1, 2, ...)
Acquisition Number	(0020,0012)	same as "Series Number"
Instance Number	(0020,0013)	unique within series
Patient Orientation	(0020,0020)	
Laterality	(0020,0060)	
Image Comments	(0020,4000)	from user input
Private Data	(0021,xxxx)	see A.2.6
Private Data	(0025,xxxx)	see A.2.7
Samples per Pixel	(0028,0002)	1
Photometric Interpretation	(0028,0004)	"MONOCHROME2"
Rows	(0028,0010)	image size depends on collimation, max. 3072
Columns	(0028,0011)	image size depends on collimation, max. 3072
Pixel Spacing	(0028,0030)	only if configured in service UI same as "Imager Pixel Spacing" (0018,1164) see A.4.3
Bits Allocated	(0028,0100)	16
Bits Stored	(0028,0101)	12
High Bit	(0028,0102)	11
Pixel Representation	(0028,0103)	0
Burned in Annotation	(0028,0301)	"NO"
Window Center	(0028,1050)	
Window Width	(0028,1051)	
Lossy Image Compression	(0028,2110)	
Private Data	(0029,xxxx)	see A.2.1 to A.2.4
Requesting Physician	(0032,1032)	from MWL
Requesting Service	(0032,1033)	from MWL
Request Description	(0032,1060)	from MWL
Requested Procedure Code Sequence	(0032,1064)	from MWL
>Code Value	(0008,0100)	
>Coding Scheme Designator	(0008,0102)	
>Coding Scheme Version	(0008,0103)	
>Code Meaning	(0008,0104)	
Study Comments	(0032,4000)	from user input
Special Needs	(0038,0050)	from MWL
Patient State	(0038,0500)	from MWL
Performed Procedure Step Start Date	(0040,0244)	same as "Study Date" (0008,0020)
Performed Procedure Step Start Time	(0040,0245)	same as "Study Time" (0008,0030)
Performed Procedure Step ID	(0040,0253)	from MWL or created by system
Performed Procedure Step Description	(0040,0254)	
Performed Protocol Code Sequence	(0040,0260)	from MWL or MPPS UI
>Code Value	(0008,0100)	
>Coding Scheme Designator	(0008,0102)	
>Coding Scheme Version	(0008,0103)	
>Code Meaning	(0008,0104)	
Request Attributes Sequence	(0040,0275)	from MWL
>Scheduled Procedure Step Description	(0040,0007)	
>Scheduled Protocol Code Sequence	(0040,0008)	
>>Code Value	(0008,0100)	
>>Coding Scheme Designator	(0008,0102)	
>>Coding Scheme Version	(0008,0103)	
>>Code Meaning	(0008,0104)	
>Scheduled Procedure Step ID	(0040,0009)	
>Requested Procedure ID	(0040,1001)	

Attribute Name	Tag	Value
Confidentiality Constraint on Patient Data Description	(0040,3001)	from MWL
Presentation LUT Shape	(2050,0020)	"IDENTITY"
Overlay Rows	(60xx,0010)	same as "Rows" (0028,0010)
Overlay Columns	(60xx,0011)	same as "Columns" (0028,0011)
Number of Frames in Overlay	(60xx,0015)	1 (if Overlay encoded in [60xx,3000])
Overlay Description	(60xx,0022)	"Siemens MedCom Object Graphics"
Overlay Type	(60xx,0040)	"G"
Overlay Origin	(60xx,0050)	1\1
Image Frame Origin	(60xx,0051)	1 (if Overlay encoded in [60xx,3000])
Overlay Bits Allocated	(60xx,0100)	16 or 1 (if Overlay encoded in [60xx,3000])
Overlay Bit Position	(60xx,0102)	12 or 0 (if Overlay encoded in [60xx,3000])
Overlay Data	[60xx,3000]	Graphics Overlay
Pixel Data	(7FE0,0010)	

A.6 Digital X-Ray Image Storage - For Presentation Standard Extended SOP Class

The AXIOM Aristos Workstation will create images encoded as DX - For Presentation Standard extended SOP Class. Please see the following table for complete overview of supplied Type 1/2/3 Standard and Private attributes:

"overview of supplied attributes – DX image"

Attribute Name	Tag	Value
Specific Character Set	(0008,0005)	(conf. Character Set is added, if needed)
Image Type	(0008,0008)	see A.4.1
SOP Class UID	(0008,0016)	1.2.840.10008.5.1.4.1.1.1.1
SOP Instance UID	(0008,0018)	
Study Date	(0008,0020)	
Series Date	(0008,0021)	
Acquisition Date	(0008,0022)	
Content Date	(0008,0023)	
Study Time	(0008,0030)	
Series Time	(0008,0031)	
Acquisition Time	(0008,0032)	
Content Time	(0008,0033)	
Accession Number	(0008,0050)	from MWL or user input
Modality	(0008,0060)	"DX"
Presentation Intent Type	(0008,0068)	"FOR PRESENTATION"
Manufacturer	(0008,0070)	"SIEMENS"
Institution Name	(0008,0080)	from MWL, configuration or user input
Institution Address	(0008,0081)	from MWL
Referring Physician's Name	(0008,0090)	from MWL or user input
Station Name	(0008,1010)	from system configuration
Study Description	(0008,1030)	
Procedure Code Sequence	(0008,1032)	from MWL
>Code Value	(0008,0100)	
>Coding Scheme Designator	(0008,0102)	
>Coding Scheme Version	(0008,0103)	
>Code Meaning	(0008,0104)	
Series Description	(0008,103E)	organ program name
Physician(s) of Record	(0008,1048)	from MWL
Performing Physician's Name	(0008,1050)	from MWL or user input
Operator's Name	(0008,1070)	from user input
Admitting Diagnoses Description	(0008,1080)	from MWL or user input
Manufacturer's Model Name	(0008,1090)	"SIEMENS FD-X"
Referenced Study Sequence	(0008,1110)	from MWL
>Referenced SOP Class UID	(0008,1150)	
>Referenced SOP Instance UID	(0008,1155)	
Referenced Procedure Step Sequence	(0008,1111)	reference to MPPS
>Referenced SOP Class UID	(0008,1150)	
>Referenced SOP Instance UID	(0008,1155)	
Referenced Patient Sequence	(0008,1120)	from MWL
>Referenced SOP Class UID	(0008,1150)	
>Referenced SOP Instance UID	(0008,1155)	
Derivation Description	(0008,2111)	info about flip and rotate
Anatomic Region Sequence	(0008,2218)	zero-length
Patient's Name	(0010,0010)	from MWL or user input
Patient ID	(0010,0020)	from MWL or user input

Attribute Name	Tag	Value
Patient's Birth Date	(0010,0030)	from MWL or user input
Patient's Sex	(0010,0040)	from MWL or user input
Other Patient IDs	(0010,1000)	from MWL
Other Patient Names	(0010,1001)	from MWL
Patient's Age	(0010,1010)	calculated from (0010,0030) or user input
Patient's Size	(0010,1020)	from MWL or user input
Patient's Weight	(0010,1030)	from MWL or user input
Patient's Address	(0010,1040)	from MWL or user input
Military Rank	(0010,1080)	from MWL or user input
Medical Alerts	(0010,2000)	from MWL
Contrast Allergies	(0010,2110)	from MWL
Ethnic Group	(0010,2160)	from MWL or user input
Smoking Status	(0010,21A0)	from MWL
Additional Patient History	(0010,21B0)	from MWL
Pregnancy Status	(0010,21C0)	from MWL
Last Menstrual Date	(0010,21D0)	from MWL
Patient Comments	(0010,4000)	from MWL or user input
Body Part Examined	(0018,0015)	from OGP description, zero-length if not present
KVP	(0018,0060)	
Device Serial Number	(0018,1000)	from configuration
Software Version (s)	(0018,1020)	
Protocol Name	(0018,1030)	same as "Series Description"
Distance Source to Detector	(0018,1110)	
Distance Source to Patient	(0018,1111)	only if anatomic measurement is activated
Estimated Radiographic Magnification Factor	(0018,1114)	only if anatomic measurement is activated = (0018,1110) / (0018,1111)
Exposure Time	(0018,1150)	
X-Ray Tube Current	(0018,1151)	
Exposure	(0018,1152)	
Exposure in µAs	(0018,1153)	
Image Area Dose Product	(0018,115E)	
Filter Type	(0018,1160)	"NONE" or "CU_0.1_MM" or "CU_0.2_MM" or "CU_0.3_MM"
Imager Pixel Spacing	(0018,1164)	"0.143", "0.143 "
Grid	(0018,1166)	"NONE" or "FOCUSED"
Date of Last Calibration	(0018,1200)	
Acquisition Device Processing Description	(0018,1400)	Diamond View Description
Acquisition Device Processing Code	(0018,1401)	Diamond View Code
Relative X-Ray Exposure	(0018,1405)	EXI value
Tomo Layer Height	(0018,1460)	only for Tomography
Tomo Angle	(0018,1470)	only for Tomography
Tomo Time	(0018,1480)	only for Tomography
Positioner Type	(0018,1508)	
Patient Position	(0018,5100)	see A.4.2
View Position	(0018,5101)	
Sensitivity	(0018,6000)	
Detector Conditions Nominal Flag	(0018,7000)	
Detector Temperature	(0018,7001)	
Detector Type	(0018,7004)	"SCINTILLATOR"
Detector Description	(0018,7006)	Detector Data: - Factory Serial Number - Factory Date Code - Configuration Version - Factory Part Number
Detector ID	(0018,700A)	Factory Serial Number
Date of Last Detector Calibration	(0018,700C)	same as "Date of Last Calibration"

Attribute Name	Tag	Value
Time of Last Detector Calibration	(0018,700E)	
Grid Focal Distance	(0018,704C)	"1150" or "1500" or "1800" or "3000"
Private Data	(0019,xxxx)	see A.2.5
Study Instance UID	(0020,000D)	from MWL or created by system
Series Instance UID	(0020,000E)	created by system
Study ID	(0020,0010)	from MWL or created by system
Series Number	(0020,0011)	unique within patient (1, 2, ...)
Acquisition Number	(0020,0012)	same as "Series Number"
Instance Number	(0020,0013)	unique within series
Patient Orientation	(0020,0020)	from organ program or user input
Image Laterality	(0020,0062)	from organ program or user input
Image Comments	(0020,4000)	from user input
Private Data	(0021,xxxx)	see A.2.6
Private Data	(0025,xxxx)	see A.2.7
Samples per Pixel	(0028,0002)	1
Photometric Interpretation	(0028,0004)	"MONOCHROME2"
Rows	(0028,0010)	image size depends on collimation, max. 3072
Columns	(0028,0011)	image size depends on collimation, max. 3072
Pixel Spacing	(0028,0030)	only if configured in service UI same as "Imager Pixel Spacing" (0018,1164) see A.4.3
Bits Allocated	(0028,0100)	16
Bits Stored	(0028,0101)	12
High Bit	(0028,0102)	11
Pixel Representation	(0028,0103)	0
Burned in Annotation	(0028,0301)	"NO"
Pixel Intensity Relationship	(0028,1040)	"LIN"
Pixel Intensity Relationship Sign	(0028,1041)	-1
Window Center	(0028,1050)	
Window Width	(0028,1051)	
Rescale Intercept	(0028,1052)	"0"
Rescale Slope	(0028,1053)	"1"
Rescale Type	(0028,1054)	"US"
Lossy Image Compression	(0028,2110)	
Private Data	(0029,xxxx)	see A.2.1 to A.2.4
Requesting Physician	(0032,1032)	from MWL
Requesting Service	(0032,1033)	from MWL
Request Description	(0032,1060)	from MWL
Requested Procedure Code Sequence	(0032,1064)	from MWL
>Code Value	(0008,0100)	
>Coding Scheme Designator	(0008,0102)	
>Coding Scheme Version	(0008,0103)	
>Code Meaning	(0008,0104)	
Study Comments	(0032,4000)	from user input
Special Needs	(0038,0050)	from MWL
Patient State	(0038,0500)	from MWL
Performed Procedure Step Start Date	(0040,0244)	same as "Study Date" (0008,0020)
Performed Procedure Step Start Time	(0040,0245)	same as "Study Time" (0008,0030)
Performed Procedure Step ID	(0040,0253)	from MWL or created by system
Performed Procedure Step Description	(0040,0254)	
Performed Protocol Code Sequence	(0040,0260)	from MWL or MPPS UI
>Code Value	(0008,0100)	
>Coding Scheme Designator	(0008,0102)	
>Coding Scheme Version	(0008,0103)	

Attribute Name	Tag	Value
>Code Meaning	(0008,0104)	
Request Attributes Sequence	(0040,0275)	from MWL
>Scheduled Procedure Step Description	(0040,0007)	
>Scheduled Protocol Code Sequence	(0040,0008)	
>>Code Value	(0008,0100)	
>>Coding Scheme Designator	(0008,0102)	
>>Coding Scheme Version	(0008,0103)	
>>Code Meaning	(0008,0104)	
>Scheduled Procedure Step ID	(0040,0009)	
>Requested Procedure ID	(0040,1001)	
Acquisition Context Sequence	(0040,0555)	zero-length
Confidentiality Constraint on Patient Data Description	(0040,3001)	from MWL
Presentation LUT Shape	(2050,0020)	"IDENTITY"
Overlay Rows	(60xx,0010)	same as "Rows" (0028,0010)
Overlay Columns	(60xx,0011)	same as "Columns" (0028,0010)
Number of Frames in Overlay	(60xx,0015)	1 (if Overlay encoded in [60xx,3000])
Overlay Description	(60xx,0022)	"Siemens MedCom Object Graphics"
Overlay Type	(60xx,0040)	"G"
Overlay Origin	(60xx,0050)	1\1
Image Frame Origin	(60xx,0051)	1 (if Overlay encoded in [60xx,3000])
Overlay Bits Allocated	(60xx,0100)	16 or 1 (if Overlay encoded in [60xx,3000])
Overlay Bit Position	(60xx,0102)	12 or 0 (if Overlay encoded in [60xx,3000])
Overlay Data	[60xx,3000]	Graphics Overlay
Pixel Data	(7FE0,0010)	

A.7 Modification of attributes of rejected images

The AXIOM Aristos Workstation will change attributes if an image is rejected (deleted). Please see the following table for complete overview of modified Type 1/2/3 Standard attributes:

"overview of modified attributes"

Attribute Name	Tag	Value
SOP Instance UID	(0008,0018)	created by system
Patient's Name	(0010,0010)	Rejected_<month>_<year>
Patient ID	(0010,0020)	Rejected_<month>_<year>
Patient's Birth Date	(0010,0030)	Set fix to "10000101"
Patient's Sex	(0010,0040)	Set fix to "O"
Patient's Age	(0010,1010)	calculated from (0010,0030) or user input
Study Instance UID	(0020,000D)	created by system
Series Instance UID	(0020,000E)	created by system
Study Comments	(0032,4000)	<original value from 0010,10> < original value from 0010,20>

A.8 Private Non-Image SOP Class

The AXIOM Aristos will create numerical data that cannot be correlated to an individual image instance and therefore need to be stored in separate instance(s). This is necessary to correlate the information in the right level of the DICOM data model hierarchy. Since there is no fitting DICOM SOP Class definition, SIEMENS has created a private “Non-Image IOD” to contain numerical data heaps to be managed within a DICOM structure. Please see previous chapters of the Appendix for IOD definition and the following tables for detailed encoding of the different “Non-Image SOP Class Instances”.

“overview of supplied attributes – NON-image Exam Protocol”

Attribute Name	Tag	Value
Specific Character Set	(0008,0005)	(conf. Character Set is added, if needed)
Image Type	(0008,0008)	"ORIGINAL\PRIMARY\SINGLE PLANE\\EXAM PROTOCOL"
SOP Class UID	(0008,0016)	1.3.12.2.1107.5.9.1
SOP Instance UID	(0008,0018)	
Study Date	(0008,0020)	
Series Date	(0008,0021)	
Study Time	(0008,0030)	
Series Time	(0008,0031)	
Accession Number	(0008,0050)	from MWL or user input
Modality	(0008,0060)	CR or DX
Referring Physician's Name	(0008,0090)	from MWL or user input
Study Description	(0008,1030)	
Procedure Code Sequence	(0008,1032)	from MWL
>Code Value	(0008,0100)	
>Coding Scheme Designator	(0008,0102)	
>Coding Scheme Version	(0008,0103)	
>Code Meaning	(0008,0104)	
Series Description	(0008,103E)	"EXAM PROTOCOL"
Physician(s) of Record	(0008,1048)	from MWL
Admitting Diagnoses Description	(0008,1080)	from MWL or user input
Referenced Study Sequence	(0008,1110)	from MWL
>Referenced SOP Class UID	(0008,1150)	
>Referenced SOP Instance UID	(0008,1155)	
Referenced Patient Sequence	(0008,1120)	from MWL
>Referenced SOP Class UID	(0008,1150)	
>Referenced SOP Instance UID	(0008,1155)	
Patient's Name	(0010,0010)	from MWL or user input
Patient ID	(0010,0020)	from MWL or user input
Patient's Birth Date	(0010,0030)	from MWL or user input
Patient's Sex	(0010,0040)	from MWL or user input
Other Patient IDs	(0010,1000)	from MWL
Other Patient Names	(0010,1001)	from MWL
Patient's Age	(0010,1010)	calculated from (0010,0030) or user input
Patient's Size	(0010,1020)	from MWL or user input
Patient's Weight	(0010,1030)	from MWL or user input
Patient's Address	(0010,1040)	from MWL or user input
Military Rank	(0010,1080)	from MWL or user input
Medical Alerts	(0010,2000)	from MWL
Contrast Allergies	(0010,2110)	from MWL
Ethnic Group	(0010,2160)	from MWL or user input
Smoking Status	(0010,21A0)	from MWL

Attribute Name	Tag	Value
Additional Patient History	(0010,21B0)	from MWL
Pregnancy Status	(0010,21C0)	from MWL
Last Menstrual Date	(0010,21D0)	from MWL
Patient Comments	(0010,4000)	from MWL or user input
Study Instance UID	(0020,000D)	from MWL or created by system
Series Instance UID	(0020,000E)	created by system
Study ID	(0020,0010)	from MWL or created by system
Series Number	(0020,0011)	"999"
Private Data	(0029,xxxx)	see A.2.1 to A.2.4
Requesting Physician	(0032,1032)	from MWL
Requesting Service	(0032,1033)	from MWL
Request Description	(0032,1060)	from MWL
Requested Procedure Code Sequence	(0032,1064)	from MWL
>Code Value	(0008,0100)	
>Coding Scheme Designator	(0008,0102)	
>Coding Scheme Version	(0008,0103)	
>Code Meaning	(0008,0104)	
Special Needs	(0038,0050)	from MWL
Patient State	(0038,0500)	from MWL
Confidentiality Constraint on Patient Data Description	(0040,3001)	from MWL
Private Data	(7FE1,0010)	see A.1.3.1

A.9 DICOM Print SCU – detailed status displays

The following tables document the behavior of the AXIOM Aristos DICOM Print AE in response to messages received for the printer SOP class and the print job SOP class.

Definitions of camera symbols:

- Idle: Camera is installed and ready; idle icon is displayed.
- Interact: The user has to react in near future, but not immediately.
  Example: A camera was low in 8x10 clear sheets: LOW 8x10 CLR was sent by n-event-report.
- Queue Stopped: The user has to react immediately. Either the camera needs immediate interaction or a job has been aborted.
  Example: A camera is out of 8x10 clear sheets, or camera is down, or a film job is aborted.

Note: different camera symbols are displayed according to the Printer Status Info.

The Printer Status (Success, Warning, Failure) is not evaluated, since the Printer Status Info is much more detailed and allows a more appropriate reaction of the system.

A.9.1 Common Status Information

"Common Status Info evaluation"

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
NORMAL	Camera is ready	Camera is ready	<None>/idle
BAD RECEIVE MGZ	There is a problem with the film receive magazine. Films from the printer cannot be transported into the magazine.	Problem with receive magazine.	<None>/interact
BAD SUPPLY MGZ	There is a problem with the film supply magazine. Films from this magazine cannot be transported into the printer.	Problem with supply magazine.	<None>/interact
CALIBRATING	Printer is performing self calibration, it is expected to be available for normal operation shortly.	Self calibration. Please wait.	<None>/idle
CALIBRATION ERR	An error in the printer calibration has been detected, quality of processed films may not be optimal.	Problem in calibration. Film quality may not be optimal.	<None>/interact
CHECK CHEMISTRY	A problem with the processor chemicals has been detected, quality of processed films may not be optimal.	Problem with chemistry. Film quality may not be optimal.	<None>/interact
CHECK SORTER	There is an error in the film sorter	Error in film sorter.	<None>/interact
CHEMICALS EMPTY	There are no processing chemicals in the processor, films will not be printed and processed until the processor is back to normal.	Camera chemistry empty. Please check.	<None>/interact
CHEMICALS LOW	The chemical level in the processor is low, if not corrected, it will probably shut down soon.	Camera chemistry low. Please check.	<None>/interact
COVER OPEN	One or more printer or processor covers, drawers, doors are open.	Camera cover, drawer or door open.	<None>/interact
ELEC CONFIG ERR	Printer configured improperly for this job.	Camera configured improperly for this job. Queue stopped.	**Queue for this camera will be STOPPED/ Queue stopped**
ELEC DOWN	Printer is not operating due to some unspecified electrical hardware problem.	Camera electrical hardware Problem.	<None>/interact
ELEC SW ERROR	Printer not operating for some unspecified software error.	Camera software problem. Queue stopped.	**Queue for this camera will be STOPPED/**

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
			Queue stopped
EMPTY 8x10	The 8x10 inch film supply magazine is empty.	8x10 film supply empty.	<None>/interact
EMPTY 8x10 BLUE	The 8x10 inch blue film supply magazine is empty.	8x10 blue film supply empty.	<None>/interact
EMPTY 8x10 CLR	The 8x10 inch clear film supply magazine is empty.	8x10 clear film supply empty.	<None>/interact
EMPTY 8x10 PAPR	The 8x10 inch paper supply magazine is empty.	8x10 paper supply empty.	<None>/interact
EMPTY 10x12	The 10x12 inch film supply magazine is empty.	10x12 film supply empty.	<None>/interact
EMPTY 10x12 BLUE	The 10x12 inch blue film supply magazine is empty.	10x12 blue film supply empty.	<None>/interact
EMPTY 10x12 CLR	The 10x12 inch clear film supply magazine is empty.	10x12 clear film supply empty.	<None>/interact
EMPTY 10x12 PAPR	The 10x12 inch paper supply magazine is empty.	10x12 paper supply empty.	<None>/interact
EMPTY 10x14	The 10x14 inch film supply magazine is empty.	10x14 film supply empty.	<None>/interact
EMPTY 10x14 BLUE	The 10x14 inch blue film supply magazine is empty.	10x14 blue film supply empty.	<None>/interact
EMPTY 10x14 CLR	The 10x14 inch clear film supply magazine is empty.	10x14 clear film supply empty.	<None>/interact
EMPTY 10x14 PAPR	The 10x14 inch paper supply magazine is empty.	10x14 paper supply empty.	<None>/interact
EMPTY 11x14	The 11x14 inch film supply magazine is empty.	11x14 film supply empty.	<None>/interact
EMPTY 11x14 BLUE	The 11x14 inch blue film supply magazine is empty.	11x14 blue film supply empty.	<None>/interact
EMPTY 11x14 CLR	The 11x14 inch clear film supply magazine is empty.	11x14 clear film supply empty.	<None>/interact
EMPTY 11x14 PAPR	The 11x14 inch paper supply magazine is empty.	11x14 paper supply empty.	<None>/interact
EMPTY 14x14	The 14x14 inch film supply magazine is empty.	14x14 film supply empty.	<None>/interact
EMPTY 14x14 BLUE	The 14x14 inch blue film supply magazine is empty.	14x14 blue film supply empty.	<None>/interact
EMPTY 14x14 CLR	The 14x14 inch clear film supply magazine is empty.	14x14 clear film supply empty.	<None>/interact
EMPTY 14x14 PAPR	The 14x14 inch paper supply magazine is empty.	14x14 paper supply empty.	<None>/interact
EMPTY 14x17	The 14x17 inch film supply magazine is empty.	14x17 film supply empty.	<None>/interact
EMPTY 14x17 BLUE	The 14x17 inch blue film supply magazine is empty.	14x17 blue film supply empty.	<None>/interact
EMPTY 14x17 CLR	The 14x17 inch clear film supply magazine is empty.	14x17 clear film supply empty.	<None>/interact
EMPTY 14x17 PAPR	The 14x17 inch paper supply magazine is empty.	14x17 paper supply empty.	<None>/interact
EMPTY 24x24	The 24x24 inch film supply magazine is empty.	24x24 film supply empty.	<None>/interact
EMPTY 24x24 BLUE	The 24x24 inch blue film supply magazine is empty.	24x24 blue film supply empty.	<None>/interact
EMPTY 24x24 CLR	The 24x24 inch clear film supply magazine is empty.	24x24 clear film supply empty.	<None>/interact
EMPTY 24x24 PAPR	The 24x24 inch paper supply magazine is empty.	24x24 paper supply empty	<None>/interact
EMPTY 24x30	The 24x30 inch film supply magazine is empty.	24x30 film supply empty.	<None>/interact
EMPTY 24x30 BLUE	The 24x30 inch blue film supply magazine is empty.	24x30 blue film supply empty.	<None>/interact
EMPTY 24x30 CLR	The 24x30 inch clear film supply magazine is empty.	24x30 clear film supply empty.	<None>/interact
EMPTY 24x30 PAPR	The 24x30 inch paper supply magazine is empty.	24x30 paper supply empty.	<None>/interact
EMPTY A4 PAPR	The A4 paper supply magazine is empty.	A4 paper supply empty	<None>/interact
EMPTY A4 TRANS	The A4 transparency supply magazine is empty.	A4 transparency supply empty.	<None>/interact

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
EXPOSURE FAILURE	The exposure device has failed due to some unspecified reason.	Exposure device has failed.	<None>/interact
FILM JAM	A film transport error has occurred and a film is jammed in the printer or processor.	Film jam.	<None>/interact
FILM TRANSP ERR	There is a malfunction with the film transport, there may or may not be a film jam.	Film transport problem.	<None>/interact
FINISHER EMPTY	The finisher is empty.	Finisher is empty.	<None>/interact
FINISHER ERROR	The finisher is not operating due to some unspecified reason	Finisher problem.	<None>/interact
FINISHER LOW	The finisher is low on supplies.	Finisher low.	<None>/interact
LOW 8x10	The 8x10 inch film supply magazine is low.	8x10 film supply low.	<None>/interact
LOW 8x10 BLUE	The 8x10 inch blue film supply magazine is low.	8x10 blue film supply low.	<None>/interact
LOW 8x10 CLR	The 8x10 inch clear film supply magazine is low.	8x10 clear film supply low.	<None>/interact
LOW 8x10 PAPR	The 8x10 inch paper supply magazine is low.	8x10 paper supply low.	<None>/interact
LOW 10x12	The 10x12 inch film supply magazine is low.	10x12 film supply low.	<None>/interact
LOW 10x12 BLUE	The 10x12 inch blue film supply magazine is low.	10x12 blue film supply low.	<None>/interact
LOW 10x12 CLR	The 10x12 inch clear film supply magazine is low.	10x12 clear film supply low.	<None>/interact
LOW 10x12 PAPR	The 10x12 inch paper supply magazine is low.	10x12 paper supply low.	<None>/interact
LOW 10x14	The 10x14 inch film supply magazine is low.	10x14 film supply low.	<None>/interact
LOW 10x14 BLUE	The 10x14 inch blue film supply magazine is low.	10x14 blue film supply low.	<None>/interact
LOW 10x14 CLR	The 10x14 inch clear film supply magazine is low.	10x14 clear film supply low.	<None>/interact
LOW 10x14 PAPR	The 10x14 inch paper supply magazine is low.	10x14 paper supply low.	<None>/interact
LOW 11x14	The 11x14 inch film supply magazine is low.	11x14 film supply low.	<None>/interact
LOW 11x14 BLUE	The 11x14 inch blue film supply magazine is low.	11x14 blue film supply low.	<None>/interact
LOW 11x14 CLR	The 11x14 inch clear film supply magazine is low.	11x14 clear film supply low.	<None>/interact
LOW 11x14 PAPR	The 11x14 inch paper supply magazine is low.	11x14 paper supply low.	<None>/interact
LOW 14x14	The 14x14 inch film supply magazine is low.	14x14 film supply low.	<None>/interact
LOW 14x14 BLUE	The 14x14 inch blue film supply magazine is low.	14x14 blue film supply low.	<None>/interact
LOW 14x14 CLR	The 14x14 inch clear film supply magazine is low.	14x14 clear film supply low.	<None>/interact
LOW 14x14 PAPR	The 14x14 inch paper supply magazine is low.	14x14 paper supply low.	<None>/interact
LOW 14x17	The 14x17 inch film supply magazine is low.	14x17 film supply low.	<None>/interact
LOW 14x17 BLUE	The 14x17 inch blue film supply magazine is low.	14x17 blue film supply low.	<None>/interact
LOW 14x17 CLR	The 14x17 inch clear film supply magazine is low.	14x17 clear film supply low.	<None>/interact
LOW 14x17 PAPR	The 14x17 inch paper supply magazine is low.	14x17 paper supply low.	<None>/interact
LOW 24x24	The 24x24 inch film supply magazine is low.	24x24 film supply low.	<None>/interact
LOW 24x24 BLUE	The 24x24 inch blue film supply magazine is low.	24x24 blue film supply low.	<None>/interact
LOW 24x24 CLR	The 24x24 inch clear film supply magazine is low.	24x24 clear film supply low.	<None>/interact
LOW 24x24 PAPR	The 24x24 inch paper supply magazine is low.	24x24 paper supply low.	<None>/interact
LOW 24x30	The 24x30 inch film supply magazine is	24x30 film supply low.	<None>/interact

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
	low.		
LOW 24x30 BLUE	The 24x30 inch blue film supply magazine is low.	24x30 blue film supply low.	<None>/interact
LOW 24x30 CLR	The 24x30 inch clear film supply magazine is low.	24x30 clear film supply low.	<None>/interact
LOW 24x30 PAPR	The 24x30 inch paper supply magazine is low.	24x30 paper supply low.	<None>/interact
LOW A4 PAPR	The A4 paper supply magazine is low.	A4 paper supply low.	<None>/interact
LOW A4 TRANS	The A4 transparency supply magazine is low..	A4 transparency supply low.	<None>/interact
NO RECEIVE MGZ	The film receive magazine is not available.	Film receiver not available.	<None>/interact
NO RIBBON	The ribbon cartridge needs to be replaced.	Replace ribbon cartridge.	<None>/interact
NO SUPPLY MGZ	The film supply magazine is not available.	Film supply not available.	<None>/interact
CHECK PRINTER	The printer is not ready at this time, operator intervention is required to make the printer available.	Check camera.	<None>/interact
CHECK PROC	The processor is not ready at this time, operator intervention is required to make the printer available.	Check processor.	<None>/interact
PRINTER DOWN	The printer is not operating due to some unspecified reason.	Camera down.	<None>/interact
PRINTER INIT	The printer is not ready at this time, it is expected to become available without intervention. For example, it may be in a normal warm-up state.	Camera initializing.	<None>/Idle
PRINTER OFFLINE	The printer has been disabled by an operator or service person.	Camera off-line.	<None>/interact
PROC DOWN	The processor is not operating due to some unspecified reason.	Processor down.	<None>/interact
PROC INIT	The processor is not ready at this time, it is expected to become available without intervention. For example, it may be in a normal warm-up state.	Processor initializing.	<None>/Idle
PROC OVERFLOW FL	Processor chemicals are approaching the overflow full mark.	Processor chemicals near overflow.	<None>/interact
PROC OVERFLOW HI	Processor chemicals have reached the overflow full mark.	Processor chemicals overflow.	<None>/interact
QUEUED	Print job in Queue	--	<None>/Idle
RECEIVER FULL	The film receive magazine is full.	Receiver full.	<None>/interact
REQ MED NOT INST	The requested film, paper, or other media supply magazine is installed in the printer, but may be available with operator intervention.	Install media supply.	<None>/interact
REQ MED NOT AVAI	The requested film, paper, or other media requested is not available on this printer.	Media supply not available on this camera. Queue stopped. Change camera.	**Queue for this camera will be STOPPED/ Queue stopped**
RIBBON ERROR	There is an unspecified problem with the print ribbon.	Error with print ribbon.	<None>/interact
SUPPLY EMPTY	The printer is out of film.	Camera out of film.	<None>/interact
SUPPLY LOW	The film supply is low.	Film supply low.	<None>/interact
UNKNOWN	There is an unspecified problem.	Unspecified problem with camera.	<None>/interact

A.9.2 Additional Status Information – AGFA printers

"Additional Agfa printer Status Info evaluation"

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
WARMING UP	Printer is in the warm-up stage. Spooling of print jobs to disk is still possible.	Camera is warming up.	<None>/idle

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
OFFLINE	OFFLINE Printer is switched off-line. Spooling of print jobs to disk is still possible.	Camera is switched off-line.	<None>/interact
NONE	General printer warning, no specific information is available. Spooling of print jobs to disk is still possible.	--	<None>/idle

A.9.3 Additional Status Information – Kodak PACS Link 9410 (formerly Imation)

"Additional Kodak PACS Link 9410 (Imation) printer Status Info evaluation"

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
SUPPLY MGZ ERR	The supply magazine has an error.	Film supply has an error.	<None>/interact

A.9.4 Additional Status Information – Kodak 190

"Additional Kodak 190 printer Status Info evaluation"

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
PRINTER STOPPED	The printer has stopped.	Camera has stopped.	<None>/interact
FATAL ERROR	Fatal Error.	Fatal Error. Queue stopped.	**Queue for this camera will be STOPPED/ Queue stopped**

A.9.5 Additional Status Information – Kodak 2180/1120

"Additional Kodak 2180/1120 printer Status Info evaluation"

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
PRINTER NOT RDY	Printer not ready.	Camera not ready..	<None>/interact
CHECK PROCESSOR	Check processor.	Check processor.	<None>/interact
NO TONER	No toner.	No toner.	<None>/interact
FATAL	Fatal Error.	Fatal Error. Queue stopped.	**Queue for this camera will be STOPPED/ Queue stopped**

A.9.6 Additional Status Information – Codonics

"Additional Codonics printer Status Info evaluation"

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
STANDARD	Printer is ready.	Camera is ready.	<None>/Normal
LOAD A-SIZE	Load A-Size media.	Load A-Size media.	<None>/interact
LOAD A-DVPAPER	Load A-Size black and white paper.	Load A-Size black and white paper.	<None>/interact
LOAD A-CVPAPER	Load A-Size color paper.	Load A-Size color paper.	<None>/interact
LOAD A-CVTRANS	Load A-Size transparencies.	Load A-Size transparencies.	<None>/interact
LOAD A4-SIZE	Load A4-Size media.	Load A4-Size media.	<None>/interact

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
LOAD A4-DVPAPER	Load A4-Size black and white paper.	Load A4-Size black and white paper.	<None>/interact
LOAD A4-CVPAPER	Load A4-Size color paper.	Load A4-Size color paper.	<None>/interact
LOAD A4-CVTRANS	Load A4-Size transparencies.	Load A4-Size transparencies.	<None>/interact
LOAD LA-SIZE	Load LA-Size media.	Load LA-Size media.	<None>/interact
LOAD LA-DVPAPER	Load LA-Size black and white paper.	Load LA-Size black and white paper.	<None>/interact
LOAD LA-CVPAPER	Load LA-Size color paper.	Load LA-Size color paper.	<None>/interact
LOAD LA-CVTRANS	Load LA-Size transparencies.	Load LA-Size transparencies.	<None>/interact
LOAD LA4-SIZE	Load LA4-Size media.	Load LA4-Size media.	<None>/interact
LOAD LA4-DVPAPER	Load LA4-Size black and white paper.	Load LA4-Size black and white paper.	<None>/interact
LOAD LA4-CVPAPER	Load LA4-Size color paper.	Load LA4-Size color paper.	<None>/interact
LOAD LA4-CVTRANS	Load LA4-Size transparencies.	Load LA4-Size transparencies.	<None>/interact
LOAD XLA-SIZE	Load XLA-Size media.	Load XLA-Size media.	<None>/interact
LOAD XLA-DVPAPER	Load XLA-Size black and white paper.	Load XLA-Size black and white paper.	<None>/interact
LOAD XLA-CVPAPER	Load XLA-Size color paper.	Load XLA-Size color paper.	<None>/interact
LOAD XLA-CVTRANS	Load XLA-Size transparencies.	Load XLA-Size transparencies.	<None>/interact
LOAD XLA4-SIZE	Load XLA4-Size media.	Load XLA4-Size media.	<None>/interact
LOAD XLA4-DVPAPER	Load XLA4-Size black and white paper.	Load XLA4-Size black and white paper.	<None>/interact
LOAD XLA4-CVPAPER	Load XLA4-Size color paper.	Load XLA4-Size color paper.	<None>/interact
LOAD XLA4-CVTRANS	Load XLA4-Size transparencies.	Load XLA4-Size transparencies.	<None>/interact
LOAD XLW-SIZE	Load XLW-Size media.	Load XLW-Size media.	<None>/interact
LOAD XLW-DVPAPER	Load XLW-Size black and white paper.	Load XLW-Size black and white paper.	<None>/interact
LOAD XLW-CVPAPER	Load XLW-Size color paper.	Load XLW-Size color paper.	<None>/interact
LOAD 8X10-SIZE	Load 8x10 media.	Load 8x10 media.	<None>/interact
LOAD 8X10-DVFILM	Load XLW-Size black and white film.	Load XLW-Size black and white film.	<None>/interact
SUPPLY MISSING	The film supply magazine specified for this job is not available.	Film supply not available.	<None>/interact
RIBBON MISSING	Ribbon is missing.	Ribbon is missing.	<None>/interact
RIBBON EMPTY	Ribbon is empty.	Ribbon is empty.	<None>/interact
TOP COVER OPEN	Top cover of printer is open.	Top cover of camera is open.	<None>/interact

A.9.7 Additional DICOM Execution Status Information

"Additional DICOM Execution Status Info evaluation"

Printer Status Info/ Execution Status Info	**Description**	**Message string visible in 'Status Bar'**	**Other action for UI/ 'camera symbol'**
INVALID PAGE DES	The specified page layout cannot be printed or other page description errors have been detected.	Film Job cannot be printed on this camera. Queue stopped. Please redirect film job.	**Queue for this camera will be STOPPED/ Queue stopped**
INSUFFICIENT MEMORY	There is not enough memory available to complete this job.	Not enough memory available in camera. Queue stopped. Please continue queue or change camera.	**Queue for this camera will be STOPPED/ Queue stopped**
NONE	General printer warning, no specific information is available. Spooling of print jobs to disk is still possible.	--	<None>/Idle