DICOM Conformance Statement – Application Annex

syngo Application Software VE52

Annex for

ARTIS product family VE50B



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SIEMENS Healthineers

1 Overview

This DICOM Conformance Statement-Application Annex describes the DICOM functionality of *syngo* Application Software which is an application hosted by ARTIS icono®/pheno®/ genio®. For simplicity, the term "ARTIS" is used throughout this document to refer to these systems.
As such, all DICOM Storage communication is handled by ARTIS, which receives SOP Instances through any supported transfer mechanism and service (Storage and/or Query/Retrieve) and stores them in its repository. ARTIS makes the SOP Instances available to the application and, in turn, stores the results of the application in its repository for further use and exchange.

This is applicable to *syngo* Application Software VE52.
The DICOM Conformance Statement of ARTIS VE50 can be found at [1].

This DICOM Conformance Statement-Application Annex outlines the supported IODs of *syngo* Application Software when deployed on ARTIS systems.

syngo Application Software creates various DICOM objects which are encoded in different SOP classes.
It conforms to the DICOM Standard and creates the SOP Classes as listed in Table 1-1.

Table 1-1: SOP Classes

SOP Classes *(Note 1)*	SOP Class UID	Create	Display
SOP Classes created by syngo Application Software			
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	Yes
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1	Yes	Yes
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Yes	Yes
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4	Yes	Yes *(Note 2)*
Surface Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.5	Yes	Yes
SOP Classes managed by *syngo* Application Software			
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1	No	Yes
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	No	Yes
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	No	Yes
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	No	Yes
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	No	Yes
Enhanced MR Color Image Storage	1.2.840.10008.5.1.4.1.1.4.3	No	Yes
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	No	Yes
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	No	Yes
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	No	Yes
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	No	Yes

Note 1: Only MONOCHROME1, MONOCHROME2 and RGB Photometric Interpretation supported.
Note 2*:* Current restriction: only self-created objects.

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3 Introduction

3.1 Revision History

Document Version	Date	Product	Product Version	Changes
10999021-ESK-001-00	01/2019	*syngo* Application Software on ARTIS icono	VE20A	Created
10999021-ESK-001-01	10/2019	*syngo* Application Software on ARTIS icono / pheno	VE20B	First release of ARTIS icono line.
11406485-ESK-001-00	12/2021	*syngo* Application Software on ARTIS icono / pheno	VE21C	Updated list of supported SOP Classes. Updated private attributes.
11546837-ESK-001-00	01/2023	*syngo* Application Software on ARTIS icono / pheno VE30	VE30A	Version based on new template. Updated private / Standard Extended attributes.
11546880-ESK-001-00	04/2024	*syngo* Application Software on ARTIS icono / pheno VE40	VE40C	Defined filter type 'IMAGE' for Captured Projection objects.
11708700-ESK-001-00	06/2025	*syngo* Application Software on ARTIS icono / pheno / genio VE5x	VE50A onwards	Updated private attributes for Segmentation and Surface Segmentation. Removed unsupported attributes from CT/MR Derived Volume Data. Updated SNOMED Codes from SRT to SCT. Updated Manufacturer / Manufacturer's Model Name. Added new value to Segment Algorithm Name in Segmentation. Added new term CARVING to Recommended Presentation Types in Surface Segmentation.
11708734-ESK-001-00	10/2026	*syngo* Application Software on ARTIS icono / pheno / genio VE50B	VE52	Updated Segmented Property Code Sequence in Surface Segmentation Object with additional SCT codes and revised code per DICOM CP-1647.

3.2 Audience

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

3.3 Remarks

This DICOM Conformance Statement is an annex to the ARTIS DICOM Conformance Statement. It is only to be used in conjunction with the ARTIS DICOM Conformance Statement and not to be used autonomously.

The scope of this DICOM Conformance Statement-Application Annex in conjunction with the DICOM Conformance Statement of ARTIS [1] is to facilitate integration between *syngo* Application Software and other DICOM products. This document should be read and understood in conjunction with the DICOM Standard [2]. DICOM by itself does not guarantee interoperability.

- This document does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality.

- This document should not replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, it is the user's responsibility to perform the following validation activities:
    - The comparison of this document and other DICOM conformant equipment is the first step towards assessing interconnectivity and interoperability between those systems.
    - Test procedures should be defined and executed to validate the required level of interoperability with specific DICOM conformant equipment, as established by the healthcare facility.

3.4 Terms and Definitions

The following list includes DICOM Terms, that are used throughout this conformance statement:

Attribute	A unit of information in an object definition; a data element identified by a tag. The information may be a complex data structure (Sequence), itself composed of lower-level data elements. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).
Data Element	A unit of information as defined by a single entry in the data dictionary. An encoded Information Object Definition (IOD) Attribute that is composed of, at a minimum, three fields: a Data Element Tag, a Value Length, and a Value Field. For some specific Transfer Syntaxes, a Data Element also contains a VR Field where the Value Representation of that Data Element is specified explicitly
Information Object Definition (IOD)	The specified set of Attributes that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. Examples: MR Image IOD, CT Image IOD, Print Job IOD. The Attributes within an IOD may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C).
Module	A set of Attributes within an Information Object Definition that are logically related to each other. Example: Patient Module includes Patient's Name, Patient ID, Patient's Birth Date, and Patient's Sex.
Tag	A 32-bit identifier for a data element, represented as a pair of four-digit hexadecimal numbers, the "group" and the "element". If the "group" number is odd, the tag is for a private (manufacturer-specific) data element. Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [private data element].
Unique Identifier (UID)	A globally unique "dotted decimal" string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.
Value Multiplicity (VM)	Indicates the number of times that either a Content Item of the specified pattern or an included Template may appear in this position.
Value Representation (VR)	The format type of an individual DICOM data element, such as text, an integer, a person's name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

3.5 Abbreviations

Abbreviations that are used in this DICOM Conformance Statement-Application Annex are listed here.

CP	Change Proposal
DCS	DICOM Conformance Statement
FoR	Frame of Reference
IOD	Information Object Definition

n.a.	not applicable
SOP	Service-Object Pair
UID	Unique Identifier
VM	Value Multiplicity
VR	Value Representation

3.6 References

1. DICOM Conformance Statements - Angiography - Siemens Healthineers - ARTIS icono floor/ceiling/biplane VE50
2. NEMA PS3 / ISO 12052, Digital Imaging and Communications in Medicine (DICOM) Standard, National Electrical Manufacturers Association, Rosslyn, VA, USA (available free at https://www.dicomstandard.org/) https://www.dicomstandard.org/current

4 Networking

n.a.

5 Media Interchange

n.a.

6 Support of Extended Character Sets

n.a.

7 Attribute Confidentiality Profiles

n.a.

8 Security

n.a.

9 Annexes

9.1 IOD Contents

9.1.1 Created SOP Instances

The following tables use a number of abbreviations. The abbreviations used in the "Presence" column are

- VNAP: Value is Not Always Present. Attribute is sent zero length if no value is present.
- ANAP: Attribute Not Always Present.
- ALWAYS: Attribute and Value are always present.
- EMPTY: Attribute is sent zero length.

The abbreviations used in the "Source" column are

- MWL: The attribute value is copied from Modality Worklist.
- USER: The attribute value is entered by the user.
- AUTO: The attribute value is generated by the system.
- CONFIG: The attribute value is obtained by configuration

9.1.1.1 Common Modules

Table 9-1: Common Modules

IE	Module	Reference	Presence of Module
Patient	Patient	Table 9-2	ALWAYS
Study	General Study	Table 9-4	ALWAYS
	Patient Study	Table 9-4	ANAP

9.1.1.1.1 Patient Module

Table 9-2: Patient Module

Attribute	Tag	Source	Value	Presence	Comments
Patient's Name	(0010,0010)	AUTO	From Original	ALWAYS	
Patient ID	(0010,0020)	AUTO	From Original	ALWAYS	
Issuer of Patient ID	(0010,0021)	AUTO	From Original	ANAP	
Patient's Birth Date	(0010,0030)	AUTO	From Original	ALWAYS	
Patient's Birth Time	(0010,0032)	AUTO	From Original	ANAP	
Patient's Sex	(0010,0040)	AUTO	From Original	ALWAYS	
Other Patient IDs	(0010,1000)	AUTO	From Original	ANAP	
Other Patient Names	(0010,1001)	AUTO	From Original	ANAP	
Patient's Birth Name	(0010,1005)	AUTO	From Original	ANAP	
Ethnic Group	(0010,2160)	AUTO	From Original	ANAP	
Patient Comments	(0010,4000)	AUTO	From Original	ANAP	

Attribute	Tag	Source	Value	Presence	Comments
Patient's Address	(0010,1040)	AUTO	From Original	ANAP	Standard Extended Attribute
Military Rank	(0010,1080)	AUTO	From Original	ANAP	Standard Extended Attribute
Branch of Service	(0010,1081)	AUTO	From Original	ANAP	Standard Extended Attribute

9.1.1.1.2 Study Modules

Table 9-3: General Study Module

Attribute	Tag	Source	Value	Presence	Comments
Study Date	(0008,0020)	AUTO	From Original	ALWAYS	
Study Time	(0008,0030)	AUTO	From Original	ALWAYS	
Accession Number	(0008,0050)	AUTO	From Original	VNAP	
Referring Physician's Name	(0008,0090)	AUTO	From Original	VNAP	
Study Description	(0008,1030)	AUTO	From Original	VNAP	
Procedure Code Sequence	(0008,1032)	AUTO	From Original	ANAP	
>Code Value	(0008,0100)	AUTO	From Original	ANAP	
>Coding Scheme Designator	(0008,0102)	AUTO	From Original	ANAP	
>Code Meaning	(0008,0104)	AUTO	From Original	ALWAYS	
Referenced Study Sequence	(0008,1110)	AUTO	From Original	ANAP	
>Referenced SOP Class UID	(0008,1150)	AUTO	From Original	ANAP	
>Referenced SOP Instance UID	(0008,1155)	AUTO	From Original	ANAP	
Study Instance UID	(0020,000D)	AUTO	From Original	ALWAYS	
Study ID	(0020,0010)	AUTO	From Original	VNAP	
Study ID Issuer	(0032,0012)	AUTO	From Original	ANAP	Standard Extended Attribute
Requesting Physician	(0032,1032)	AUTO	From Original	ANAP	Standard Extended Attribute

Attribute	Tag	Source	Value	Presence	Comments
Study Comments	(0032,4000)	AUTO	From Original	ANAP	Standard Extended Attribute

Table 9-4: Patient Study Module

Attribute	Tag	Source	Value	Presence	Comments
Admitting Diagnoses Description	(0008,1080)	AUTO	From Original	ANAP	
Patient's Age	(0010,1010)	AUTO	From Original	ANAP	
Patient's Size	(0010,1020)	AUTO	From Original	ANAP	
Patient's Weight	(0010,1030)	AUTO	From Original	ANAP	
Medical Alerts	(0010,2000)	AUTO	From Original	ANAP	
Allergies	(0010,2110)	AUTO	From Original	ANAP	
Smoking Status	(0010,21A0)	AUTO	From Original	ANAP	
Pregnancy Status	(0010,21C0)	AUTO	From Original	ANAP	
Last Menstrual Date	(0010,21D0)	AUTO	From Original	ANAP	
Additional Patient History	(0010,21B0)	AUTO	From Original	ANAP	
Admission ID	(0038,0010)	AUTO	From Original	ANAP	
Special Needs	(0038,0050)	AUTO	From Original	ANAP	Standard Extended Attribute
Current Patient Location	(0038,0300)	AUTO	From Original	ANAP	Standard Extended Attribute

9.1.1.2 SC Standard Extended SOP Class

The *syngo* Application Software will create functional images from special applications.
Those will be encoded as SC Standard Extended SOP Class:

- **Captured Projection Image** (SC Derived Image (RGB) from 3D Projections)
- **Bookmarks** (SC Derived Image (RGB) for 4D Viewer Bookmarks)
- EP Segmentation Path Objects
  The Segmentation application may create an SC Image (RGB) to contain the Segmentation results for use in a specific workflow only. The content is only useful in this context and therefore the DICOM content is "tailored" for this special use. It can be identified with the help of the following attributes:
  (0008,0008) Image Type is set to "DERIVED\SECONDARY\\INSPACE_EP_SEGM\<SW-Version>.
  (0008,0016) SOP Class UID is set to "1.2.840.10008.5.1.4.1.1.7".
  (0008,103E) Series Description is set to "EP_Segm_<object label>" or "EP_Segm_<object id>"
  The EP Segmentation Path Objects are not described in the following tables.

Please see the following tables for a complete overview of supplied Type 1/2/3 Standard and Private attributes for Captured Projection Images and Bookmarks:

Table 9-5: SC Standard Extended Image Modules

IE	Module	Reference	Presence of Module
Patient	Patient Module	Table 9-2	ALWAYS
Study	Study Modules	Table 9-3 Table 9-4	ALWAYS
Series	General Series	Table 9-6	ALWAYS
Equipment	General Equipment	Table 9-7	ALWAYS
	SC Equipment	Table 9-8	ALWAYS
Acquisition	General Acquisition	Table 9-9	If attributes are available in Original
Image	General Image	Table 9-10	ALWAYS
	General Reference	Table 9-11	If attributes are available in Original or if derived from single image
	Image Pixel	Table 9-12	ALWAYS
	SC Image	Table 9-13	ALWAYS
	SOP Common	Table 9-14	ALWAYS
	Private Bookmarks	Table 9-15	For Bookmarks
	MEDCOM Header	Table 9-16	If Bookmarks contain binary data

Table 9-6: SC Image: General Series Module

Attribute	Tag	Source	Value	Presence	Comments
Modality	(0008,0060)	CONFIG	Captured Projection Images: OT or XA or CT (default = OT, can be configured) Bookmarks: XA	ALWAYS	
Series Instance UID	(0020,000E)	AUTO	<new UID>	ALWAYS	
Series Number	(0020,0011)	AUTO	Captured Projection: 940 for Ranges, 970 for all other Captured Projection objects. Bookmarks: 980	ALWAYS	
Series Date	(0008,0021)	AUTO	<yyyymmdd>	ALWAYS	
Series Time	(0008,0031)	AUTO	<hhmmss.ffffff>	ALWAYS	
Performing Physician's Name	(0008,1050)	AUTO	From Original	ANAP	

Attribute	Tag	Source	Value	Presence	Comments
Protocol Name	(0018,1030)	AUTO	Captured Projection Images: "Radial Ranges", "Parallel Ranges", "Volume Ranges", "Curved Ranges" or from Original Bookmarks: "Bookmark"	ANAP	
Series Description	(0008,103E)	AUTO		ALWAYS	
Operators' Name	(0008,1070)	AUTO	From Original	ANAP	
Related Series Sequence	(0008,1250)	AUTO	From Original	ANAP	
>Study Instance UID	(0020,000D)	AUTO	From Original	ALWAYS	
>Series Instance UID	(0020,000E)	AUTO	From Original	ALWAYS	
>Purpose of Reference Code Sequence	(0040,A170)	AUTO	<zero length>	EMPTY	
Body Part Examined	(0018,0015)	AUTO	From Original	ANAP	
Patient Position	(0018,5100)	AUTO	From Original	ANAP	
Request Attributes Sequence	(0040,0275)	AUTO	From Original	ANAP	
>Scheduled Procedure Step Description	(0040,0007)	AUTO	From Original	ANAP	
>Scheduled Procedure Step ID	(0040,0009)	AUTO	From Original	ANAP	
>Requested Procedure ID	(0040,1001)	AUTO	From Original	ANAP	
>Reason for the Requested Procedure	(0040,1002)	AUTO	From Original	ANAP	
Performed Procedure Step Start Date	(0040,0244)	AUTO	From Original	ANAP	
Performed Procedure Step Start Time	(0040,0245)	AUTO	From Original	ANAP	
Performed Procedure Step ID	(0040,0253)	AUTO	From Original	ANAP	
Performed Procedure Step Description	(0040,0254)	AUTO	From Original	ANAP	
Comments on the Performed Procedure Step	(0040,0280)	AUTO	From Original	ANAP	

Table 9-7: SC Image: General Equipment Module

Attribute	Tag	Source	Value	Presence	Comments
Manufacturer	(0008,0070)	AUTO	From Original	VNAP	
Institution Name	(0008,0080)	CONFIG	From configuration	ANAP	
Institution Address	(0008,0081)	CONFIG	From configuration	ANAP	
Station Name	(0008,1010)	CONFIG	From configuration	ANAP	
Institutional Department Name	(0008,1040)	CONFIG	From configuration	ANAP	
Manufacturer's Model Name	(0008,1090)	AUTO	From Original	ANAP	
Device Serial Number	(0018,1000)	AUTO	From Original	ANAP	
Software Versions	(0018,1020)	AUTO	From Original	ANAP	

Table 9-8: SC Image: SC Equipment Module

Attribute	Tag	Source	Value	Presence	Comments
Conversion Type	(0008,0064)	AUTO	WSD	ALWAYS	
Secondary Capture Device ID	(0018,1010)	CONFIG	From configuration	ALWAYS	
Secondary Capture Device Manufacturer	(0018,1016)	AUTO	“Siemens Healthineers”	ALWAYS	
Secondary Capture Device Manufacturer's Model Name	(0018,1018)	AUTO	"syngo_Application_SW_SYS"	ALWAYS	
Secondary Capture Device Software Version	(0018,1019)	AUTO	From configuration	ALWAYS	

Table 9-9: SC Image: General Acquisition Module

Attribute	Tag	Source	Value	Presence	Comments
Acquisition Number	(0020,0012)	AUTO	From Original	ANAP	
Acquisition Date	(0008,0022)	AUTO	From Original	ANAP	
Acquisition Time	(0008,0032)	AUTO	From Original	ANAP	
Acquisition DateTime	(0008,002A)	AUTO	From Original	ANAP	
Images in Acquisition	(0020,1002)	AUTO	From Original	ANAP	

Table 9-10: SC Image: General Image Module

Attribute	Tag	Source	Value	Presence	Comments
Instance Number	(0020,0013)	AUTO	n-m (n, m >0)	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
			0 for reference image		
Patient Orientation	(0020,0020)	AUTO	From Original (derived from single image) or calculated or <zero length> (derived from multiple images).	VNAP	
Content Date	(0008,0023)	AUTO	<yyyymmdd>	ALWAYS	
Content Time	(0008,0033)	AUTO	<hhmmss.ffffff>	ALWAYS	
Image Type	(0008,0008)	AUTO	Captured Projection Images: DERIVED\SECONDARY\OTHER\IAE_PRJ\ <Filter_Type> <Filter_Type> values: MPR MPR_CV MIP MIP_CV MINIP VRT IMAGE OVERVIEW Bookmarks: DERIVED\SEONDARY\OTHER\IAE	ALWAYS	
Image Comments	(0020,4000)	AUTO/USER	From Original if derived from single image Captured Projection Images: Ranges parameters in case of parallel or curved ranges. Bookmarks: May be set by user.	ANAP	
Burned In Annotation	(0028,0301)	AUTO	Captured Projection: YES	ANAP	
Lossy Image Compression	(0028,2110)	AUTO	From Original	ANAP	

Table 9-11: SC Image: General Reference Module

Attribute	Tag	Source	Value	Presence	Comments
Derivation Description	(0008,2111)	AUTO	From Original	ANAP	
Source Image Sequence	(0008,2112)	AUTO	If derived from single image	ANAP	

Table 9-12: SC Image: Image Pixel Module

Attribute	Tag	Source	Value	Presence	Comments
Samples per Pixel	(0028,0002)	AUTO	3	ALWAYS	
Photometric Interpretation	(0028,0004)	AUTO	RGB	ALWAYS	
Planar Configuration	(0028,0006)	AUTO	0	ALWAYS	
Rows	(0028,0010)	AUTO		ALWAYS	
Columns	(0028,0011)	AUTO		ALWAYS	
Bits Allocated	(0028,0100)	AUTO	8	ALWAYS	
Bits Stored	(0028,0101)	AUTO	8	ALWAYS	
High Bit	(0028,0102)	AUTO	7	ALWAYS	
Pixel Representation	(0028,0103)	AUTO	0	ALWAYS	
Pixel Data	(7FE0,0010)	AUTO	Bookmarks: Representative image icon	ALWAYS	

Table 9-13: SC Image: SC Image Module

Attribute	Tag	Source	Value	Presence	Comments
Date of Secondary Capture	(0018,1012)	AUTO	<yyyymmdd>	ALWAYS	
Time of Secondary Capture	(0018,1014)	AUTO	<hhmmss.ffffff>	ALWAYS	
Pixel Spacing	(0028,0030)	AUTO	Captured Projection: If image has been calibrated	ANAP	
Pixel Spacing Calibration Type	(0028,0A02)	AUTO	From Original	ANAP	
Pixel Spacing Calibration Description	(0028,0A04)	AUTO	From Original	ANAP	

Table 9-14: SC Image: SOP Common Module

Attribute	Tag	Source	Value	Presence	Comments
Specific Character Set	(0008,0005)	AUTO	From Original	ANAP	
SOP Class UID	(0008,0016)	AUTO	1.2.840.10008.5.1.4.1.1.7	ALWAYS	
SOP Instance UID	(0008,0018)	AUTO		ALWAYS	
Instance Creation Date	(0008,0012)	AUTO	<yyyymmdd>	ALWAYS	
Instance Creation Time	(0008,0013)	AUTO	<hhmmss.ffffff>	ALWAYS	
Instance Creator UID	(0008,0014)	AUTO	<implementation_class_uid>.<individual_id>	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
Instance Number	(0020,0013)	AUTO	Captured Projection: n-m (n, m >0) 0 for reference image Bookmarks: 1-n	ALWAYS	
Archive Requested	(0040,A494)	AUTO	YES, if object is stored with "To be archived"-status, NO if stored with "Not to be archived"-status.	ALWAYS	Standard Extended Attribute

Table 9-15: SC Image: Private Bookmarks Module

Attribute	Tag	Source	Value	Presence	Comments
Private Creator	(0019,00xx)	AUTO	Bookmarks: "SIEMENS SMS-AX IAE"	ALWAYS	For Bookmarks
Attributes according to 9.2 Data Dictionary of Private Attributes					

Table 9-16: SC Image: MEDCOM Header Module

Attribute	Tag	Source	Value	Presence	Comments
Private Creator	(0029,00xx)	AUTO	Bookmarks: "SIEMENS MEDCOM HEADER"	ANAP	
Attributes according to 9.2 Data Dictionary of Private Attributes					

9.1.1.3 CT Standard Extended SOP Class

The syngo Application Software will create the following functional images which will be encoded as CT Standard Extended SOP Class:

- 3D volume datasets from **3D reconstruction** application package (DynaCT)
- **Image from Ranges or "Save image"** functionality based on CT, XR3D or Enhanced CT Images

9.1.1.3.1 DynaCT Reconstructed Volume Data

Please see the following tables for a complete overview of supplied Type 1/2/3 Standard and Private attributes:

Table 9-17: CT Derived Image from Reconstruction (Monochrome) Modules

IE	Module	Reference	Presence of Module
Patient	Patient Module	Table 9-2	ALWAYS
Study	Study Modules	Table 9-3 Table 9-4	ALWAYS
Series	General Series	Table 9-18	ALWAYS

IE	Module	Reference	Presence of Module
Frame of Reference	Frame of Reference	Table 9-19	ALWAYS
Equipment	General Equipment	Table 9-20	ALWAYS
Acquisition	General Acquisition	Table 9-21	ALWAYS
Image	General Image	Table 9-22	ALWAYS
	General Reference	Table 9-23	ALWAYS
	Image Plane	Table 9-24	ALWAYS
	Image Pixel	Table 9-25	ALWAYS
	Contrast/Bolus	Table 9-26	If available in Original
	CT Image	Table 9-27	ALWAYS
	VOI LUT	Table 9-28	ALWAYS
	SOP Common	Table 9-29	ALWAYS
	Private DynaCT	Table 9-30	ALWAYS

Table 9-18: CT Reconstruction: General Series Module

Attribute	Tag	Source	Value	Presence	Comments
Modality	(0008,0060)	CONFIG	XA or CT (default = XA, can be configured)	ALWAYS	
Series Instance UID	(0020,000E)	AUTO	<new UID>	ALWAYS	
Series Number	(0020,0011)	AUTO	From Original	ALWAYS	
Laterality	(0020,0060)	AUTO	From Original	ANAP	
Series Date	(0008,0021)	AUTO	<yyyymmdd>	ALWAYS	
Series Time	(0008,0031)	AUTO	<hhmmss.ffffff>	ALWAYS	
Performing Physician's Name	(0008,1050)	AUTO	From Original	ANAP	
Protocol Name	(0018,1030)	AUTO	<name of organ program> <zoom size> <step width> <dose> <correction> <auto transfer>	ALWAYS	
Series Description	(0008,103E)	AUTO	Contains information about used reconstruction parameters	ALWAYS	
Operators' Name	(0008,1070)	AUTO	From Original	ANAP	
Operator Identification Sequence	(0008,0172)	AUTO	From Original	ANAP	

Attribute	Tag	Source	Value	Presence	Comments
Referenced Performed Procedure Step Sequence	(0008,1111)	AUTO	From Original	ANAP	
Related Series Sequence	(0008,1250)	AUTO	Reference to Study and Series of originating images	ALWAYS	
>Study Instance UID	(0020,000D)	AUTO	Reference to Study	ALWAYS	
>Series Instance UID	(0020,000E)	AUTO	Reference to Series	ALWAYS	
>Purpose of Reference Code Sequence	(0040,A170)	AUTO	(121323, DCM, "Source series for image processing operation")	ALWAYS	
Body Part Examined	(0018,0015)	AUTO	From Original	ANAP	
Patient Position	(0018,5100)	AUTO	From Original	ALWAYS	
Request Attributes Sequence	(0040,0275)	AUTO	From Original	ANAP	
>Scheduled Procedure Step Description	(0040,0007)	AUTO	From Original	ANAP	
>Scheduled Procedure Step ID	(0040,0009)	AUTO	From Original	ANAP	
>Requested Procedure ID	(0040,1001)	AUTO	From Original	ANAP	
>Reason for the Requested Procedure	(0040,1002)	AUTO	From Original	ANAP	
Performed Procedure Step Start Date	(0040,0244)	AUTO	From Original	ANAP	
Performed Procedure Step Start Time	(0040,0245)	AUTO	From Original	ANAP	
Performed Procedure Step ID	(0040,0253)	AUTO	From Original	ANAP	
Performed Procedure Step Description	(0040,0254)	AUTO	From Original	ANAP	
Comments on the Performed Procedure Step	(0040,0280)	AUTO	From Original	ANAP	

Table 9-19: CT Reconstruction: Frame of Reference Module

Attribute	Tag	Source	Value	Presence	Comments
Frame of Reference UID	(0020,0052)	AUTO	<new UID> (per reconstructed image-set)	ALWAYS	
Position Reference Indicator	(0020,1040)	AUTO	From Original	VNAP	

Table 9-20: CT Reconstruction: General Equipment Module

Attribute	Tag	Source	Value	Presence	Comments
Manufacturer	(0008,0070)	AUTO	“Siemens Healthineers”	ALWAYS	
Institution Name	(0008,0080)	AUTO	From Original	ANAP	
Institution Address	(0008,0081)	AUTO	From Original	ANAP	
Station Name	(0008,1010)	CONFIG	From configuration	ANAP	
Manufacturer's Model Name	(0008,1090)	CONFIG	Equipment-specific Model Name based on “First System Startup” configuration	ALWAYS	
Device Serial Number	(0018,1000)	CONFIG	From configuration	ALWAYS	
Software Versions	(0018,1020)	AUTO	From Original\<product version of *syngo Application Software*>	ALWAYS	
Date of Last Calibration	(0018,1200)	AUTO	<yyyymmdd> (date of last 3D calibration)	ALWAYS	
Time of Last Calibration	(0018,1201)	AUTO	<hhmmss.ffffff> (time of last 3D calibration)	ALWAYS	
Pixel Padding Value	(0028,0120)	AUTO		ALWAYS	

Table 9-21: CT Reconstruction: General Acquisition Module

Attribute	Tag	Source	Value	Presence	Comments
Acquisition Number	(0020,0012)	AUTO	From Original	VNAP	
Acquisition Date	(0008,0022)	AUTO	From Original	ANAP	
Acquisition Time	(0008,0032)	AUTO	From Original	ANAP	
Acquisition DateTime	(0008,002A)	AUTO	From Original or calculated	ANAP	

Table 9-22: CT Reconstruction: General Image Module

Attribute	Tag	Source	Value	Presence	Comments
Content Date	(0008,0023)	AUTO	<yyyymmdd>	ALWAYS	
Content Time	(0008,0033)	AUTO	<hhmmss.ffffff>	ALWAYS	
Burned In Annotation	(0028,0301)	AUTO	NO	ALWAYS	
Lossy Image Compression	(0028,2110)	AUTO	00	ALWAYS	

Table 9-23: CT Reconstruction: General Reference Module

Attribute	Tag	Source	Value	Presence	Comments
Derivation Description	(0008,2111)	AUTO	Code for applied correction algorithms	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
Source Image Sequence	(0008,2112)	AUTO	Reference to original images from 2D acquisition	ALWAYS	

Table 9-24: CT Reconstruction: Image Plane Module

Attribute	Tag	Source	Value	Presence	Comments
Pixel Spacing	(0028,0030)	AUTO	Calculated	ALWAYS	
Image Position (Patient)	(0020,0032)	AUTO	Calculated	ALWAYS	
Image Orientation (Patient)	(0020,0037)	AUTO	Calculated	ALWAYS	
Slice Thickness	(0018,0050)	AUTO	Calculated	ALWAYS	

Table 9-25: CT Reconstruction: Image Pixel Module

Attribute	Tag	Source	Value	Presence	Comments
Rows	(0028,0010)	AUTO	256, 512, 768 or 1024	ALWAYS	
Columns	(0028,0011)	AUTO	256, 512, 768 or 1024	ALWAYS	
Pixel Representation	(0028,0103)	AUTO	0	ALWAYS	
Smallest Image Pixel Value	(0028,0106)	AUTO		ALWAYS	
Largest Image Pixel Value	(0028,0107)	AUTO		ALWAYS	
Pixel Data	(7FE0,0010)	AUTO		ALWAYS	

Table 9-26: CT Reconstruction: Contrast/Bolus Module

Attribute	Tag	Source	Value	Presence	Comments
Contrast/Bolus Agent	(0018,0010)	AUTO	From Original	ANAP	
Contrast/Bolus Ingredient	(0018,1048)	AUTO	From Original	ANAP	

Table 9-27: CT Reconstruction: CT Image Module

Attribute	Tag	Source	Value	Presence	Comments
Samples per Pixel	(0028,0002)	AUTO	1	ALWAYS	
Image Type	(0008,0008)	AUTO	DERIVED\SECONDARY\AXIAL\3D ANGIO\<Data_Type> <Data_Type> values: NAT_MASK Images acquired w/o contrast media NAT_FILL	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
			Images acquired with contrast media SUB Subtracted acquisition PBV "Parenchymal Blood Volume" acq.		
Photometric Interpretation	(0028,0004)	AUTO	MONOCHROME2	ALWAYS	
Bits Allocated	(0028,0100)	AUTO	16	ALWAYS	
Bits Stored	(0028,0101)	AUTO	16	ALWAYS	
High Bit	(0028,0102)	AUTO	15	ALWAYS	
Rescale Intercept	(0028,1052)	AUTO	0.0 or -1024 (only for HU values)	ALWAYS	
Rescale Slope	(0028,1053)	AUTO	1	ALWAYS	
Rescale Type	(0028,1054)	AUTO	"HU" for Hounsfield Units, "US" for unspecified; depends on first value of Convolution Kernel.	ALWAYS	
KVP	(0018,0060)	AUTO	From Original	VNAP	
Scan Options	(0018,0022)	AUTO	For images created by "Gated Cardiac 3D Acquisition"	ANAP	
Reconstruction Diameter	(0018,1100)	AUTO	Set for reconstructed slice	ALWAYS	Standard Extended Attribute
Distance Source to Detector	(0018,1110)	AUTO	From Original	ALWAYS	
Convolution Kernel	(0018,1210)	AUTO	<kernel type>\<Image characteristics> Values for kernel type: "EE" (Default for high contrast) "HU" (Default for DynaCT) Values for image characteristics: "Auto", "Sharp", "Normal", "Smooth", "Very Smooth"	ALWAYS	Standard Extended Attribute

Table 9-28: CT Reconstruction: VOI LUT Module

Attribute	Tag	Source	Value	Presence	Comments
VOI LUT Sequence	(0028,3010)	AUTO	From Original	ANAP	
Window Center	(0028,1050)	AUTO	Value from the "Visualization Preset" configuration (multi-valued, default image viewing value as 1st value, additional	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
			image viewing value as 2nd value).		
Window Width	(0028,1051)	AUTO	Value from the "Visualization Preset" configuration (multi-valued, default image viewing value as 1st value, additional image viewing value as 2nd value).	ALWAYS	

Table 9-29: CT Reconstruction: SOP Common Module

Attribute	Tag	Source	Value	Presence	Comments
Specific Character Set	(0008,0005)	AUTO	From Original	ANAP	
SOP Class UID	(0008,0016)	AUTO	1.2.840.10008.5.1.4.1.1.2 (CT Image Storage)	ALWAYS	
SOP Instance UID	(0008,0018)	AUTO		ALWAYS	
Instance Number	(0020,0013)	AUTO	1 (feet) continuous to number of slices (head)	ALWAYS	
Instance Creation Date	(0008,0012)	AUTO	<yyyymmdd>	ALWAYS	
Instance Creation Time	(0008,0013)	AUTO	<hhmmss.ffffff>	ALWAYS	
Archive Requested	(0040,A494)	AUTO	YES, if object is stored with "To be archived"-status, NO if stored with "Not to be archived"-status.	ALWAYS	Standard Extended Attribute

Table 9-30: CT Reconstruction: Private DynaCT Module

Attribute	Tag	Source	Value	Presence	Comments
Private Creator	(0019,00xx)	AUTO	"SIEMENS AX DYNACT"	ALWAYS	
Attributes according to 9.2 Data Dictionary of Private Attributes					
Private Creator	(0021,00xx)	AUTO	"SIEMENS SMS-AX ACQ 1.0" *(Note)*	ALWAYS	
Attributes according to 9.2 Data Dictionary of Private Attributes					

Note: contains double-spaces in the name definitions: SIEMENS SMS-AX<spc><spc>ACQ 1.0

9.1.1.3.2 CT Ranges / Save Image as Derived Volume Data

Please see the following tables for a complete overview of supplied Type 1/2/3 Standard and Private attributes:

Table 9-31: Ranges / Save Image as CT Derived Image (Monochrome) Modules

IE	Module	Reference	Presence of Module
Patient	Patient Module	Table 9-2	ALWAYS
Study	Study Modules	Table 9-3 Table 9-4	ALWAYS
Series	General Series	Table 9-32	ALWAYS
Frame of Reference	Frame of Reference	Table 9-33	ALWAYS
Equipment	General Equipment	Table 9-34	ALWAYS
Acquisition	General Acquisition	Table 9-35	ALWAYS
Image	General Image	Table 9-36	ALWAYS
	General Reference	Table 9-37	ALWAYS
	Image Plane	Table 9-38	ALWAYS
	Image Pixel	Table 9-39	ALWAYS
	CT Image	Table 9-40	ALWAYS
	VOI LUT	Table 9-41	ALWAYS
	SOP Common	Table 9-42	ALWAYS

Table 9-32: CT Derived Volume Data: General Series Module

Attribute	Tag	Source	Value	Presence	Comments
Modality	(0008,0060)	CONFIG	Depending on Original: CT (if derived from CT or Enhanced CT) or as configured (XA or CT) (if derived from XR3D)	ALWAYS	
Series Instance UID	(0020,000E)	AUTO	<new UID>	ALWAYS	
Series Number	(0020,0011)	AUTO	940 for Ranges, from Original for all other Derived Volume Data	VNAP	
Laterality	(0020,0060)	AUTO	From Original	ANAP	
Series Date	(0008,0021)	AUTO	<yyyymmdd>	ALWAYS	
Series Time	(0008,0031)	AUTO	<hhmmss.ffffff>	ALWAYS	
Performing Physician's Name	(0008,1050)	AUTO	From Original	ANAP	
Protocol Name	(0018,1030)	AUTO	"Radial Ranges", "Parallel Ranges", "Volume Ranges", "Curved Ranges" or from Original	ANAP	
Series Description	(0008,103E)	AUTO/USER		ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
Operators' Name	(0008,1070)	AUTO	From Original	ANAP	
Operator Identification Sequence	(0008,0172)	AUTO	From Original	ANAP	
Referenced Performed Procedure Step Sequence	(0008,1111)	AUTO	From Original	ANAP	
Related Series Sequence	(0008,1250)	AUTO	From Original	ANAP	
>Study Instance UID	(0020,000D)	AUTO	From Original	ALWAYS	
>Series Instance UID	(0020,000E)	AUTO	From Original	ALWAYS	
>Purpose of Reference Code Sequence	(0040,A170)	AUTO	<zero length>	EMPTY	
Body Part Examined	(0018,0015)	AUTO	From Original	ANAP	
Patient Position	(0018,5100)	AUTO	From Original	ANAP	
Request Attributes Sequence	(0040,0275)	AUTO	From Original	ANAP	
>Scheduled Procedure Step Description	(0040,0007)	AUTO	From Original	ANAP	
>Scheduled Procedure Step ID	(0040,0009)	AUTO	From Original	ANAP	
>Requested Procedure ID	(0040,1001)	AUTO	From Original	ANAP	
>Reason for the Requested Procedure	(0040,1002)	AUTO	From Original	ANAP	
Performed Procedure Step Start Date	(0040,0244)	AUTO	From Original	ANAP	
Performed Procedure Step Start Time	(0040,0245)	AUTO	From Original	ANAP	
Performed Procedure Step ID	(0040,0253)	AUTO	From Original	ANAP	
Performed Procedure Step Description	(0040,0254)	AUTO	From Original	ANAP	
Comments on the Performed Procedure Step	(0040,0280)	AUTO	From Original	ANAP	

Table 9-33: CT Derived Volume Data: Frame of Reference Module

Attribute	Tag	Source	Value	Presence	Comments
Frame of Reference UID	(0020,0052)	AUTO	<new UID> or <existing UID> if spatially related.	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
Position Reference Indicator	(0020,1040)	AUTO		VNAP	

Table 9-34: CT Derived Volume Data: General Equipment Module

Attribute	Tag	Source	Value	Presence	Comments
Manufacturer	(0008,0070)	AUTO	From Original	VNAP	
Institution Name	(0008,0080)	CONFIG	From configuration	ANAP	
Institution Address	(0008,0081)	CONFIG	From configuration	ANAP	
Station Name	(0008,1010)	CONFIG	From configuration	ANAP	
Institutional Department Name	(0008,1040)	CONFIG	From configuration	ANAP	
Manufacturer's Model Name	(0008,1090)	AUTO	From Original	ANAP	
Device Serial Number	(0018,1000)	CONFIG	From Original	ANAP	
Software Versions	(0018,1020)	AUTO	From Original\<product version of *syngo Application Software*>	ALWAYS	
Date of Last Calibration	(0018,1200)	AUTO	From Original	ANAP	
Time of Last Calibration	(0018,1201)	AUTO	From Original	ANAP	
Pixel Padding Value	(0028,0120)	AUTO		ANAP	

Table 9-35: CT Derived Volume Data: General Acquisition Module

Attribute	Tag	Source	Value	Presence	Comments
Acquisition Number	(0020,0012)	AUTO	From Original if Original is a CT image, empty in case Original is an XR3D image	ANAP	
Acquisition Date	(0008,0022)	AUTO	From Original	ANAP	
Acquisition Time	(0008,0032)	AUTO	From Original	ANAP	
Acquisition DateTime	(0008,002A)	AUTO	From Original or calculated	ANAP	

Table 9-36: CT Derived Volume Data: General Image Module

Attribute	Tag	Source	Value	Presence	Comments
Content Date	(0008,0023)	AUTO	<yyyymmdd>	ALWAYS	
Content Time	(0008,0033)	AUTO	<hhmmss.ffffff>	ALWAYS	
Image Comments	(0020,4000)	AUTO	From Original if derived from single image;	ANAP	

Attribute	Tag	Source	Value	Presence	Comments
			Ranges parameters in case of Parallel or Curved Ranges		
Burned In Annotation	(0028,0301)	AUTO	From Original	ALWAYS	
Lossy Image Compression	(0028,2110)	AUTO	From Original	ANAP	

Table 9-37: CT Derived Volume Data: General Reference Module

Attribute	Tag	Source	Value	Presence	Comments
Derivation Description	(0008,2111)	AUTO	From Original	ANAP	

Table 9-38: CT Derived Volume Data: Image Plane Module

Attribute	Tag	Source	Value	Presence	Comments
Pixel Spacing	(0028,0030)	AUTO	Calculated	ALWAYS	
Image Position (Patient)	(0020,0032)	AUTO	Calculated	ALWAYS	
Image Orientation (Patient)	(0020,0037)	AUTO	Calculated	ALWAYS	
Slice Thickness	(0018,0050)	AUTO	Calculated	ALWAYS	

Table 9-39: CT Derived Volume Data: Image Pixel Module

Attribute	Tag	Source	Value	Presence	Comments
Rows	(0028,0010)	AUTO	256 or 512	ALWAYS	
Columns	(0028,0011)	AUTO	256 or 512	ALWAYS	
Pixel Representation	(0028,0103)	AUTO	From Original	ALWAYS	
Smallest Image Pixel Value	(0028,0106)	AUTO		ALWAYS	
Largest Image Pixel Value	(0028,0107)	AUTO		ALWAYS	
Pixel Data	(7FE0,0010)	AUTO		ALWAYS	

Table 9-40: CT Derived Volume Data: CT Image Module

Attribute	Tag	Source	Value	Presence	Comments
Samples per Pixel	(0028,0002)	AUTO	1	ALWAYS	
Image Type	(0008,0008)	AUTO	DERIVED\SECONDARY\<image type>\<filter type>\\\<range type> <image type> values: AXIAL	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
			LOCALIZER <filter type> values: MPR MIP MINIP <range type> values (in case of Range functionality): PARALLEL RADIAL CURVED		
Photometric Interpretation	(0028,0004)	AUTO	MONOCHROME2	ALWAYS	
Bits Allocated	(0028,0100)	AUTO	From Original	ALWAYS	
Bits Stored	(0028,0101)	AUTO	From Original	ALWAYS	
High Bit	(0028,0102)	AUTO	From Original	ALWAYS	
Rescale Intercept	(0028,1052)	AUTO	From Original	ALWAYS	
Rescale Slope	(0028,1053)	AUTO		ALWAYS	
Rescale Type	(0028,1054)	AUTO		ANAP	
KVP	(0018,0060)	AUTO	From Original	VNAP	
Scan Options	(0018,0022)	AUTO	From Original if Original is a CT image, not set in case Original is an XR3D or Enhanced CT image	ANAP	
Reconstruction Diameter	(0018,1100)	AUTO	From Original	ANAP	
Distance Source to Detector	(0018,1110)	AUTO	From Original	ANAP	
Convolution Kernel	(0018,1210)	AUTO	From Original	ANAP	

Table 9-41: CT Derived Volume Data: VOI LUT Module

Attribute	Tag	Source	Value	Presence	Comments
VOI LUT Sequence	(0028,3010)	AUTO	From Original	ANAP	
Window Center	(0028,1050)	AUTO	As set	ALWAYS	
Window Width	(0028,1051)	AUTO	As set	ALWAYS	
Window Center & Width Explanation	(0028,1055)	AUTO		ANAP	

Table 9-42: CT Derived Volume Data: SOP Common Module

Attribute	Tag	Source	Value	Presence	Comments
Specific Character Set	(0008,0005)	AUTO	From Original	ANAP	

Attribute	Tag	Source	Value	Presence	Comments
SOP Class UID	(0008,0016)	AUTO	1.2.840.10008.5.1.4.1.1.2 (CT Image Storage)	ALWAYS	
SOP Instance UID	(0008,0018)	AUTO		ALWAYS	
Instance Number	(0020,0013)	AUTO	n-m (n, m>0) 0 for reference image	ALWAYS	
Instance Creation Date	(0008,0012)	AUTO	<yyyymmdd>	ALWAYS	
Instance Creation Time	(0008,0013)	AUTO	<hhmmss.ffffff>	ALWAYS	
Instance Creator UID	(0008,0014)	AUTO	<implementation_class_uid>.<individual_id>	ALWAYS	
Archive Requested	(0040,A494)	AUTO	YES, if object is stored with "To be archived"-status, NO if stored with "Not to be archived"-status.	ALWAYS	Standard Extended Attribute

9.1.1.4 MR Standard Extended SOP Class

The syngo Application Software will save Radial, Parallel or Curved Ranges or "Save image" functionality based on MR or MR Enhanced Images as MR Standard Extended SOP Class.

9.1.1.4.1 MR Ranges / Save Image as Derived Volume Data

Please see the following tables for a complete overview of supplied Type 1/2/3 Standard and Private attributes:

Table 9-43: Ranges / Save Image as MR Derived Image (Monochrome) Modules

IE	Module	Reference	Presence of Module
Patient	Patient Module	Table 9-2	ALWAYS
Study	Study Modules	Table 9-3 Table 9-4	ALWAYS
Series	General Series	Table 9-44	ALWAYS
Frame of Reference	Frame of Reference	Table 9-45	ALWAYS
Equipment	General Equipment	Table 9-46	ALWAYS
Acquisition	General Acquisition	Table 9-47	ALWAYS
Image	General Image	Table 9-48	ALWAYS
	General Reference	Table 9-49	ALWAYS
	Image Plane	Table 9-50	ALWAYS
	Image Pixel	Table 9-51	ALWAYS
	MR Image	Table 9-52	ALWAYS

IE	Module	Reference	Presence of Module
	VOI LUT	Table 9-53	ALWAYS
	SOP Common	Table 9-54	ALWAYS

Table 9-44: MR Derived Volume Data: General Series Module

Attribute	Tag	Source	Value	Presence	Comments
Modality	(0008,0060)	AUTO	From Original	ALWAYS	
Series Instance UID	(0020,000E)	AUTO	<new UID>	ALWAYS	
Series Number	(0020,0011)	AUTO	940 for Ranges, from Original for all other Derived Volume Data	VNAP	
Laterality	(0020,0060)	AUTO	From Original	ANAP	
Series Date	(0008,0021)	AUTO	<yyyymmdd>	ALWAYS	
Series Time	(0008,0031)	AUTO	<hhmmss.ffffff>	ALWAYS	
Performing Physician's Name	(0008,1050)	AUTO	From Original	ANAP	
Protocol Name	(0018,1030)	AUTO	"Radial Ranges", "Parallel Ranges", "Volume Ranges", "Curved Ranges" or from Original	ANAP	
Series Description	(0008,103E)	AUTO//USER		ALWAYS	
Operators' Name	(0008,1070)	AUTO	From Original	ANAP	
Operator Identification Sequence	(0008,0172)	AUTO	From Original	ANAP	
Referenced Performed Procedure Step Sequence	(0008,1111)	AUTO	From Original	ANAP	
Related Series Sequence	(0008,1250)	AUTO	From Original	ANAP	
>Study Instance UID	(0020,000D)	AUTO	From Original	ALWAYS	
>Series Instance UID	(0020,000E)	AUTO	From Original	ALWAYS	
>Purpose of Reference Code Sequence	(0040,A170)	AUTO	<zero length>	EMPTY	
Body Part Examined	(0018,0015)	AUTO	From Original	ANAP	
Patient Position	(0018,5100)	AUTO	From Original	ANAP	
Requested Procedure Description	(0032,1060)	AUTO	From Original	ANAP	
Request Attributes Sequence	(0040,0275)	AUTO	From Original	ANAP	
>Scheduled Procedure Step Description	(0040,0007)	AUTO	From Original	ANAP	

Attribute	Tag	Source	Value	Presence	Comments
>Scheduled Procedure Step ID	(0040,0009)	AUTO	From Original	ANAP	
>Requested Procedure ID	(0040,1001)	AUTO	From Original	ANAP	
>Reason for the Requested Procedure	(0040,1002)	AUTO	From Original	ANAP	
Performed Procedure Step Start Date	(0040,0244)	AUTO	From Original	ANAP	
Performed Procedure Step Start Time	(0040,0245)	AUTO	From Original	ANAP	
Performed Procedure Step ID	(0040,0253)	AUTO	From Original	ANAP	
Performed Procedure Step Description	(0040,0254)	AUTO	From Original	ANAP	
Comments on the Performed Procedure Step	(0040,0280)	AUTO	From Original	ANAP	

Table 9-45: MR Derived Volume Data: Frame of Reference Module

Attribute	Tag	Source	Value	Presence	Comments
Frame of Reference UID	(0020,0052)	AUTO	<new UID> or <existing UID> if spatially related.	ALWAYS	
Position Reference Indicator	(0020,1040)	AUTO		VNAP	

Table 9-46: MR Derived Volume Data: General Equipment Module

Attribute	Tag	Source	Value	Presence	Comments
Manufacturer	(0008,0070)	AUTO	From Original	VNAP	
Institution Name	(0008,0080)	CONFIG	From configuration	ANAP	
Institution Address	(0008,0081)	Config	From configuration	ANAP	
Station Name	(0008,1010)	CONFIG	From configuration	ANAP	
Institutional Department Name	(0008,1040)	CONFIG	From configuration	ANAP	
Manufacturer's Model Name	(0008,1090)	AUTO	From Original	ANAP	
Device Serial Number	(0018,1000)	CONFIG	From Original	ANAP	
Software Versions	(0018,1020)	AUTO	From Original\<product version of *syngo Application Software*>	ALWAYS	
Date of Last Calibration	(0018,1200)	AUTO	From Original	ANAP	

Attribute	Tag	Source	Value	Presence	Comments
Time of Last Calibration	(0018,1201)	AUTO	From Original	ANAP	

Table 9-47: MR Derived Volume Data: General Acquisition Module

Attribute	Tag	Source	Value	Presence	Comments
Acquisition Number	(0020,0012)	AUTO	From Original	ANAP	
Acquisition Date	(0008,0022)	AUTO	Derived from original Acquisition/Content Date	ANAP	
Acquisition Time	(0008,0032)	AUTO	Derived from original Acquisition/Content Time	ANAP	
Acquisition DateTime	(0008,002A)	AUTO	Derived from original Acquisition Date/Time	ANAP	

Table 9-48: MR Derived Volume Data: General Image Module

Attribute	Tag	Source	Value	Presence	Comments
Content Date	(0008,0023)	AUTO	<yyyymmdd>	ALWAYS	
Content Time	(0008,0033)	AUTO	<hhmmss.ffffff>	ALWAYS	
Image Comments	(0020,4000)	AUTO	From Original if derived from single image; Ranges parameters in case of Parallel or Curved Ranges	ANAP	
Burned In Annotation	(0028,0301)	AUTO	From Original	ANAP	
Lossy Image Compression	(0028,2110)	AUTO	From Original	ANAP	

Table 9-49: MR Derived Volume Data: General Reference Module

Attribute	Tag	Source	Value	Presence	Comments
Derivation Description	(0008,2111)	AUTO	From Original	ANAP	

Table 9-50: MR Derived Volume Data: Image Plane Module

Attribute	Tag	Source	Value	Presence	Comments
Pixel Spacing	(0028,0030)	AUTO	Calculated	ALWAYS	
Image Position (Patient)	(0020,0032)	AUTO	Calculated	ALWAYS	
Image Orientation (Patient)	(0020,0037)	AUTO	Calculated	ALWAYS	
Slice Thickness	(0018,0050)	AUTO	Calculated	ALWAYS	

Table 9-51: MR Derived Volume Data: Image Pixel Module

Attribute	Tag	Source	Value	Presence	Comments
Rows	(0028,0010)	AUTO	256 or 512	ALWAYS	
Columns	(0028,0011)	AUTO	256 or 512	ALWAYS	
Pixel Representation	(0028,0103)	AUTO	From Original	ALWAYS	
Pixel Data	(7FE0,0010)	AUTO		ALWAYS	

Table 9-52: MR Derived Volume Data: MR Image Module

Attribute	Tag	Source	Value	Presence	Comments
Samples per Pixel	(0028,0002)	AUTO	From Original	ALWAYS	
Image Type	(0008,0008)	AUTO	DERIVED\SECONDARY\<image type copied from original>\<filter type>\<copied from original>\<copied from original>\<range type> <image type> values: Replaced for Localizer image: OTHER <filter type> values: MPR MIP MINIP <range type> values (in case of Range functionality): PARALLEL RADIAL CURVED	ALWAYS	
Scanning Sequence	(0018,0020)	AUTO	From Original if original is an MR image, "SE", "GR"; "SE\GR", "IR" or "EP" in case original is an Enhanced MR image	ALWAYS	
Sequence Variant	(0018,0021)	AUTO	From Original if original is an MR image; "SP", "MTC", "SS", "OSP" or "SK" in case original is an Enhanced MR image	ALWAYS	
Scan Options	(0018,0022)	AUTO	From Original if original is MR image; "FC", "SP", "PFP", "PFP\PFF", "CG", "RG" or "FS" in case original is an Enhanced MR image	VNAP	
MR Acquisition Type	(0018,0023)	AUTO	From Original	VNAP	
Repetition Time	(0018,0080)	AUTO	From Original	ANAP	
Echo Time	(0018,0081)	AUTO	From Original	VNAP	
Inversion Time	(0018,0082)	AUTO	From Original	ANAP	
Echo Train Length	(0018,0091)	AUTO	From Original	VNAP	

Attribute	Tag	Source	Value	Presence	Comments
Trigger Time	(0018,1060)	AUTO	From Original	VNAP	
Photometric Interpretation	(0028,0004)	AUTO	From Original	ALWAYS	
Bits Allocated	(0028,0100)	AUTO	From Original	ALWAYS	
Bits Stored	(0028,0101)	AUTO	From Original	ALWAYS	
High Bit	(0028,0102)	AUTO	From Original	ALWAYS	

Table 9-53: MR Derived Volume Data: VOI LUT Module

Attribute	Tag	Source	Value	Presence	Comments
VOI LUT Sequence	(0028,3010)	AUTO	From Original	ANAP	
Window Center	(0028,1050)	AUTO	As set	ALWAYS	
Window Width	(0028,1051)	AUTO	As set	ALWAYS	
Window Center & Width Explanation	(0028,1055)	AUTO		ANAP	

Table 9-54: MR Derived Volume Data: SOP Common Module

Attribute	Tag	Source	Value	Presence	Comments
Specific Character Set	(0008,0005)	AUTO	From Original	ANAP	
SOP Class UID	(0008,0016)	AUTO	1.2.840.10008.5.1.4.1.1.4 (MR Image Storage)	ALWAYS	
SOP Instance UID	(0008,0018)	AUTO		ALWAYS	
Instance Number	(0020,0013)	AUTO	n-m (n, m>0) 0 for reference image	ALWAYS	
Instance Creation Date	(0008,0012)	AUTO	<yyyymmdd>	ALWAYS	
Instance Creation Time	(0008,0013)	AUTO	<hhmmss.ffffff>	ALWAYS	
Instance Creator UID	(0008,0014)	AUTO	<implementation_class_uid>.<individual_id>	ALWAYS	
Archive Requested	(0040,A494)	AUTO	YES, if object is stored with "To be archived"-status, NO if stored with "Not to be archived"-status.	ALWAYS	Standard Extended Attribute

9.1.1.5 X-Ray 3D Angiographic Image Standard Extended SOP Class

The syngo Application Software will create the following functional images which will be encoded as X-Ray 3D Angiographic Image Standard Extended SOP Class:

- **4D DSA**
  The 4D DSA data is stored with transfer syntax 1.2.840.10008.1.2.4.80 (JPEG-LS Lossless).
- **Perfusion**

Please see the following tables for a complete overview of supplied Type 1/2/3 Standard and Private attributes:

Table 9-55: X-Ray 3D Angiographic Image from Reconstruction Modules

IE	Module	Reference	Presence of Module
Patient	Patient Module	Table 9-2	ALWAYS
Study	Study Modules	Table 9-3 Table 9-4	ALWAYS
Series	General Series	Table 9-56	ALWAYS
Frame of Reference	Frame of Reference	Table 9-57	ALWAYS
Equipment	General Equipment	Table 9-58	ALWAYS
	Enhanced General Equipment	Table 9-59	ALWAYS
Image	Image Pixel	Table 9-60	ALWAYS
	Enhanced Contrast / Bolus	Table 9-61	If contrast media was applied in original images
	Acquisition Context	Table 9-62	ALWAYS
	Multi-frame Functional Groups	Table 9-63	ALWAYS
	Patient Orientation	Table 9-64	ALWAYS
	X-Ray 3D Image	Table 9-65	ALWAYS
	X-Ray 3D Angiographic Image Contributing Sources	Table 9-66	ALWAYS
	X-Ray 3D Angiographic Acquisition	Table 9-67	ALWAYS
	X-Ray 3D Reconstruction	Table 9-68	ALWAYS
	SOP Common	Table 9-69	ALWAYS
	Private XR3D	Table 9-70	ALWAYS

Table 9-56: XR3D Reconstruction: General Series Module

Attribute	Tag	Source	Value	Presence	Comments
Modality	(0008,0060)	AUTO	XA	ALWAYS	
Series Instance UID	(0020,000E)	AUTO	<new UID>	ALWAYS	
Series Number	(0020,0011)	AUTO	From Original	VNAP	
Series Date	(0008,0021)	AUTO	<yyyymmdd>	ALWAYS	
Series Time	(0008,0031)	AUTO	<hhmmss.ffffff>	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
Performing Physician's Name	(0008,1050)	AUTO	From Original	ANAP	
Protocol Name	(0018,1030)	AUTO	"<from Original> <zoom size(nnn)> <step width(n.nn)> <dose(nn.nn)> <correction(aaa)> <autotransfer rules>"	ALWAYS	
Series Description	(0008,103E)	AUTO	Contains information about used reconstruction parameters	ALWAYS	
Operators' Name	(0008,1070)	AUTO	From Original	ANAP	
Referenced Performed Procedure Step Sequence	(0008,1111)	AUTO	From Original	ANAP	
Related Series Sequence	(0008,1250)	AUTO	Reference to Study and Series of originating images	ALWAYS	
>Study Instance UID	(0020,000D)	AUTO	Reference to Study	ALWAYS	
>Series Instance UID	(0020,000E)	AUTO	Reference to Series	ALWAYS	
>Purpose of Reference Code Sequence	(0040,A170)	AUTO	(121323, DCM, "Source series for image processing operation")	ALWAYS	
Body Part Examined	(0018,0015)	AUTO	From Original	ANAP	
Patient Position	(0018,5100)	AUTO	From Original	ALWAYS	
Request Attributes Sequence	(0040,0275)	AUTO	From Original	ANAP	
>Scheduled Procedure Step Description	(0040,0007)	AUTO	From Original	ANAP	
>Scheduled Procedure Step ID	(0040,0009)	AUTO	From Original	ANAP	
>Requested Procedure ID	(0040,1001)	AUTO	From Original	ANAP	
>Reason for the Requested Procedure	(0040,1002)	AUTO	From Original	ANAP	
Performed Procedure Step Start Date	(0040,0244)	AUTO	From Original	ANAP	
Performed Procedure Step Start Time	(0040,0245)	AUTO	From Original	ANAP	
Performed Procedure Step ID	(0040,0253)	AUTO	From Original	ANAP	
Performed Procedure Step Description	(0040,0254)	AUTO	From Original	ANAP	
Comments on the Performed Procedure Step	(0040,0280)	AUTO	From Original	ANAP	

Table 9-57: XR3D Reconstruction: Frame of Reference Module

Attribute	Tag	Source	Value	Presence	Comments
Frame of Reference UID	(0020,0052)	AUTO	From Original or <new UID>	ALWAYS	
Position Reference Indicator	(0020,1040)	AUTO	From Original	VNAP	

Table 9-58: XR3D Reconstruction: General Equipment Module

Attribute	Tag	Source	Value	Presence	Comments
Institution Name	(0008,0080)	AUTO	From Original	ANAP	
Institution Address	(0008,0081)	AUTO	From Original	ANAP	
Station Name	(0008,1010)	CONFIG	From configuration	ANAP	
Institutional Department Name	(0008,1040)	CONFIG	From configuration	ANAP	
Date of Last Calibration	(0018,1200)	AUTO	<yyyymmdd> (date of last 3D calibration)	ALWAYS	
Time of Last Calibration	(0018,1201)	AUTO	<hhmmss.ffffff> (time of last 3D calibration)	ALWAYS	
Pixel Padding Value	(0028,0120)	AUTO		ANAP	

Table 9-59: XR3D Reconstruction: Enhanced General Equipment Module

Attribute	Tag	Source	Value	Presence	Comments
Manufacturer	(0008,0070)	AUTO	“Siemens Healthineers”	ALWAYS	
Manufacturer's Model Name	(0008,1090)	CONFIG	Equipment-specific Model Name based on “First System Startup” configuration	ALWAYS	
Device Serial Number	(0018,1000)	CONFIG	From configuration	ALWAYS	
Software Versions	(0018,1020)	AUTO	From Original\<product version of syngo Application Software>	ALWAYS	

Table 9-60: XR3D Reconstruction: Image Pixel Module

Attribute	Tag	Source	Value	Presence	Comments
Rows	(0028,0010)	AUTO	256, 512, 768 or 1042	ALWAYS	
Columns	(0028,0011)	AUTO	256, 512, 768 or 1042	ALWAYS	
Bits Allocated	(0028,0100)	AUTO	16	ALWAYS	
Bits Stored	(0028,0101)	AUTO	16	ALWAYS	
High Bit	(0028,0102)	AUTO	15	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
Pixel Representation	(0028,0103)	AUTO	0	ALWAYS	
Pixel Data	(7FE0,0010)	AUTO		ALWAYS	

Table 9-61: XR3D Reconstruction: Enhanced Contrast/Bolus Module

Attribute	Tag	Source	Value	Presence	Comments
Contrast/Bolus Agent Sequence	(0018,0012)	AUTO	If contrast media was applied in original images (7140000, SCT, "Contrast Agent")	ANAP	
>Contrast/Bolus Administration Route Sequence	(0018,0014)	AUTO	(261665006, SCT, "Unknown")	ALWAYS	
>Contrast/Bolus Volume	(0018,1041)	AUTO	<zero length>	ALWAYS	
>Contrast/Bolus Ingredient Concentration	(0018,1049)	AUTO	<zero length>	ALWAYS	
>Contrast/Bolus Agent Number	(0018,9337)	AUTO		ALWAYS	
>Contrast/Bolus Ingredient Code Sequence	(0018,9338)	AUTO	<zero length>	ALWAYS	

Table 9-62: XR3D Reconstruction: Acquisition Context Module

Attribute	Tag	Source	Value	Presence	Comments
Acquisition Context Sequence	(0040,0555)	AUTO	<zero length>	ANAP	

Table 9-63: XR3D Reconstruction: Multi-frame Functional Groups Module

Attribute	Tag	Source	Value	Presence	Comments
Content Date	(0008,0023)	AUTO	<yyyymmdd>	ALWAYS	
Content Time	(0008,0033)	AUTO	<hhmmss.ffffff>	ALWAYS	
Instance Number	(0020,0013)	AUTO	Perfusion: 1-n	ALWAYS	
Number of Frames	(0028,0008)	AUTO		ALWAYS	
Representative Frame Number	(0028,6010)	AUTO		ALWAYS	
Shared Functional Groups Sequence	(5200,9229)	AUTO		ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
>X-Ray 3D Frame Type Sequence	(0018,9504)	AUTO	1 item	ALWAYS	
>>Frame Type	(0008,9007)	AUTO	4D DSA: ORIGINAL\PRIMARY\4D_DSA\NONE Perfusion: ORIGINAL\PRIMARY\PERFUSION\NONE	ALWAYS	
>>Pixel Presentation	(0008,9205)	AUTO	MONOCHROME	ALWAYS	
>>Volumetric Properties	(0008,9206)	AUTO	VOLUME	ALWAYS	
>>Volume Based Calculation Technique	(0008,9207)	AUTO	NONE	ALWAYS	
>>Reconstruction Index	(0020,9536)	AUTO	1	ALWAYS	
>Frame Anatomy Sequence	(0020,9071)	AUTO	1 item	ALWAYS	
>>Frame Laterality	(0020,9072)	AUTO	From Original ("L" or "R", if available)	ANAP	
>>Anatomic Region Sequence	(0008,2218)	AUTO	(38266002, SCT, "Entire body")	ALWAYS	
>Plane Orientation Sequence	(0020,9116)	AUTO	1 item	ALWAYS	
>>Image Orientation (Patient)	(0020,0037)	AUTO		ALWAYS	
>Pixel Measures Sequence	(0028,9110)	AUTO	1 item	ALWAYS	
>>Pixel Spacing	(0028,0030)	AUTO		ALWAYS	
>>Slice Thickness	(0018,0050)	AUTO		ALWAYS	
>Frame VOI LUT Sequence	(0028,9132)	AUTO		ALWAYS	
>>Window Center	(0028,1050)	AUTO	<window 1 center value>\ <window 2 center value>	ALWAYS	
>>Window Width	(0028,1051)	AUTO	<window 1 width value>\ <window 2 width value>	ALWAYS	
>Real World Value Mapping Sequence	(0040,9096)	AUTO	Perfusion: 1 item	ALWAYS	
>>LUT Explanation	(0028,3003)	AUTO	"Linear Mapping"	ALWAYS	
>>Measurements Units Code Sequence	(0040,08EA)	AUTO	4D DSA: ([hnsf'U], UCUM, "Hounsfield unit")	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
			Perfusion: 1 item, drawn from Context ID 82		
>>LUT Label	(0040,9210)	AUTO	4D DSA: 1 Perfusion: same as Image Comments	ALWAYS	
>>Real World Value LUT Last Value Mapped	(0040,9211)	AUTO		ALWAYS	
>>Real World Value LUT First Value Mapped	(0040,9216)	AUTO		ALWAYS	
>>Real World Value Intercept	(0040,9224)	AUTO		ALWAYS	
>>Real World Value Slope	(0040,9225)	AUTO		ALWAYS	
Per-frame Functional Groups Sequence	(5200,9230)	AUTO	As many items as frames	ALWAYS	
>Frame Content Sequence	(0020,9111)	AUTO	1 item	ALWAYS	
>>Frame Acquisition DateTime	(0018,9074)	AUTO	From Original: attribute Acquisition DateTime (0008,002A) or calculated from Acquisition Date (0008,0022) and Acquisition Time (0008,0032)	ALWAYS	
>>Frame Reference DateTime	(0018,9151)	AUTO	4D DSA: Used to record the time course, computed using original Acquisition Date and Time value and FrameTime resp. FrameTimeVector. Perfusion: From Original: attribute Acquisition DateTime (0008,002A) or calculated from Acquisition Date (0008,0022) and Acquisition Time (0008,0032)	ALWAYS	
>>Frame Acquisition Duration	(0018,9220)	AUTO	From Original: private attribute Total Scene Time (0021,xx29) or set to 1000ms otherwise	ALWAYS	
>>Stack ID	(0020,9056)	AUTO	4D DSA: 4D_DSA Perfusion: PERFUSION	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
>>In-Stack Position Number	(0020,9057)	AUTO	Ordinal index starting with 1	ALWAYS	
>Plane Position Sequence	(0020,9113)	AUTO	1 item	ALWAYS	
>>Image Position Patient	(0020,0032)	AUTO		ALWAYS	

Table 9-64: XR3D Reconstruction: Patient Orientation Module

Attribute	Tag	Source	Value	Presence	Comments
Patient Orientation Code Sequence	(0054,0410)	AUTO	(102538003, SCT, "recumbent")	ALWAYS	
>Patient Orientation Modifier Code Sequence	(0054,0412)	AUTO	One of (40199007, SCT, "supine"), (1240000, SCT, "prone"), (102535000, SCT, "right lateral decubitus"), (102536004, SCT, "left lateral decubitus")	ALWAYS	
Patient Gantry Relationship Code Sequence	(0054,0414)	AUTO	One of (102540008, SCT, "headfirst"), (102541007, SCT, "feet-first")	ALWAYS	

Table 9-65: XR3D Reconstruction: X-Ray 3D Image Module

Attribute	Tag	Source	Value	Presence	Comments
Image Type	(0008,0008)	AUTO	4D DSA: ORIGINAL\PRIMARY\4D_DSA\NONE Perfusion: ORIGINAL\PRIMARY\PERFUSION\NONE	ALWAYS	
Pixel Presentation	(0008,9205)	AUTO	MONOCHROME	ALWAYS	
Volumetric Properties	(0008,9206)	AUTO	VOLUME	ALWAYS	
Volume Based Calculation Technique	(0008,9207)	AUTO	NONE	ALWAYS	
Convolution Kernel	(0018,1210)	AUTO	<kernel type>\<Image characteristics> Values for kernel type: "EE" (Default for high contrast) "HU" (Default for DynaCT) Values for image characteristics: "Auto", "Sharp", "Normal", "Smooth", "Very Smooth"	ALWAYS	
Content Qualification	(0018,9004)	AUTO	PRODUCT	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
Image Comments	(0020,4000)	AUTO	4D DSA: From Original Perfusion: "Nat Mask" or "Nat Fill"	VNAP	
Samples per Pixel	(0028,0002)	AUTO	1	ALWAYS	
Photometric Interpretation	(0028,0004)	AUTO	MONOCHROME2	ALWAYS	
Burned in Annotation	(0028,0301)	AUTO	NO	ALWAYS	
Lossy Image Compression	(0028,2110)	AUTO	00	ALWAYS	
Presentation LUT Shape	(2050,0020)	AUTO	IDENTITY	ALWAYS	

Table 9-66: XR3D Reconstruction: X-Ray 3D Angiographic Image Contributing Sources Module

Attribute	Tag	Source	Value	Presence	Comments
Contributing Sources Sequence	(0018,9506)	AUTO	4D DSA: 2 items (mask and contrast) Perfusion: 1 item	ALWAYS	
>Acquisition DateTime	(0008,002A)	AUTO	<yyyymmddhhmmss.ffffff>	ALWAYS	
>Manufacturer	(0008,0070)	AUTO	From Original	VNAP	
>Station Name	(0008,1010)	AUTO	From Original	ANAP	
>Operators' Name	(0008,1070)	AUTO	From Original	ANAP	
>Operator Identification Sequence	(0008,1072)	AUTO	From Original	ANAP	
>Manufacturer's Model Name	(0008,1090)	AUTO	From Original	ANAP	
>Device Serial Number	(0018,1000)	AUTO	From Original	ANAP	
>Software Versions	(0018,1020)	AUTO	From Original or from configuration, if not available.	ALWAYS	
>Protocol Name	(0018,1030)	AUTO	From Original	ANAP	
>Contributing SOP Instances Reference Sequence	(0020,9529)	AUTO	Contains reference to exactly 1 original image on study, series and instance level	ALWAYS	
>Rows	(0028,0010)	AUTO	From Original	ALWAYS	
>Columns	(0028,0011)	AUTO	From Original	ALWAYS	
>Bits Stored	(0028,0101)	AUTO	From Original	ALWAYS	
>Lossy Image Compression	(0028,2110)	AUTO	From Original	ANAP	

Attribute	Tag	Source	Value	Presence	Comments
>Lossy Image Compression Ratio	(0028,2112)	AUTO	From Original	ANAP	
>Lossy Image Compression Method	(0028,2114)	AUTO	From Original	ANAP	
>Acquisition Device Processing Description	(0018,1400)	AUTO	From Original	ANAP	
>Acquisition Device Processing Code	(0018,1401)	AUTO	From Original	ANAP	
>Acquisition Protocol Name	(0018,9423)	AUTO	From Original	ANAP	
>Plane Identification	(0018,9457)	AUTO	Derived from Original	ALWAYS	
>Imager Pixel Spacing	(0018,1164)	AUTO	From Original	ANAP	

Table 9-67: XR3D Reconstruction: X-Ray 3D Angiographic Acquisition Module

Attribute	Tag	Source	Value	Presence	Comments
X-Ray 3D Acquisition Sequence	(0018,9507)	AUTO	4D DSA: 2 items (mask and contrast) Perfusion: 1 item	ALWAYS	
>Source Image Sequence	(0008,2112)	AUTO	Points to original image	ALWAYS	
>>Referenced SOP Class UID	(0008,1150)	AUTO		ALWAYS	
>>Referenced SOP Instance UID	(0008,1155)	AUTO		ALWAYS	
>>Referenced Frame Number	(0008,1160)	AUTO	If only set of frames was taken as input	ANAP	
>Contrast/Bolus Agent	(0018,0010)	AUTO	From Original	ANAP	
>KVP	(0018,0060)	AUTO	From Original	ANAP	
>Distance Source to Detector	(0018,1110)	AUTO	From Original	ALWAYS	
>Field of View Shape	(0018,1147)	AUTO	From Original	ANAP	
>Focal Spot	(0018,1190)	AUTO	From Original	ANAP	
>Detector Type	(0018,7004)	AUTO	<zero length>	ALWAYS	
>Detector Description	(0018,7006)	AUTO	From Original	ANAP	
>Detector ID	(0018,700A)	AUTO	From Original	ANAP	
>Exposure Time in ms	(0018,9328)	AUTO	From Original: attribute (0018,1150)	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
>X-Ray Tube Current in mA	(0018,9330)	AUTO	From Original: attribute (0018,1151)	ALWAYS	
>Exposure in mAs	(0018,9332)	AUTO	From Original: attribute (0018,1152)	ANAP	

Table 9-68: XR3D Reconstruction: X-Ray 3D Reconstruction Module

Attribute	Tag	Source	Value	Presence	Comments
X-Ray 3D Reconstruction Sequence	(0018,9530)	AUTO	1 item	ALWAYS	
>Application Name	(0018,9524)	AUTO	"3D Reconstruction"	ALWAYS	
>Application Version	(0018,9525)	AUTO	Version of reconstruction application	ALWAYS	
>Application Manufacturer	(0018,9526)	AUTO	“Siemens Healthineers”	ALWAYS	
>Algorithm Type	(0018,9527)	AUTO	"FILTER_BACK_PROJ"	ALWAYS	
>Reconstruction Description	(0018,9531)	AUTO	Code for applied correction algorithms	ALWAYS	
>Acquisition Index	(0020,9518)	AUTO	4D DSA: 1\2 Perfusion: 1	ALWAYS	

Table 9-69: XR3D Reconstruction: SOP Common Module

Attribute	Tag	Source	Value	Presence	Comments
Specific Character Set	(0008,0005)	AUTO	From Original	ANAP	
Instance Creation Date	(0008,0012)	AUTO	<yyyymmdd>	ALWAYS	
Instance Creation Time	(0008,0013)	AUTO	<hhmmss.ffffff>	ALWAYS	
SOP Class UID	(0008,0016)	AUTO	1.2.840.10008.5.1.4.1.1.13.1.1	ALWAYS	
SOP Instance UID	(0008,0018)	AUTO		ALWAYS	
Archive Requested	(0040,A494)	AUTO	YES, if object is stored with "To be archived"-status, NO if stored with "Not to be archived"-status.	ALWAYS	Standard Extended Attribute

Table 9-70: XR3D Reconstruction: Private XR3D Module

Attribute	Tag	Source	Value	Presence	Comments
Private Creator	(0019,00xx)	AUTO	"SIEMENS AX DYNACT"	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
Attributes according to 9.2 Data Dictionary of Private Attributes					
Private Creator	(0021,00xx)	AUTO	"SIEMENS SMS-AX ACQ 1.0" *(Note)*	ALWAYS	
Attributes according to 9.2 Data Dictionary of Private Attributes					

Note: contains double-spaces in the name definitions: SIEMENS SMS-AX<spc><spc>ACQ 1.0

9.1.1.6 Spatial Registration SOP Class

Please see the following tables for a complete overview of supplied Type 1/2/3 Standard and Private attributes:

Table 9-71: Rigid 3D/3D Registration Result Modules

IE	Module	Reference	Presence of Module
Patient	Patient Module	Table 9-2	ALWAYS
Study	Study Modules	Table 9-3 Table 9-4	ALWAYS
Series	General Series	Table 9-72	ALWAYS
	Spatial Registration Series	Table 9-73	ALWAYS
Frame of Reference	Frame of Reference	Table 9-74	ALWAYS
Equipment	General Equipment	Table 9-75	ALWAYS
Spatial Registration	Spatial Registration	Table 9-76	ALWAYS
	Common Instance Reference	Table 9-77	ALWAYS
	SOP Common	Table 9-78	ALWAYS

Table 9-72: Registration: General Series Module

Attribute	Tag	Source	Value	Presence	Comments
Series Date	(0008,0021)	AUTO	<yyyymmdd>	ALWAYS	
Series Time	(0008,0031)	AUTO	<hhmmss.ffffff>	ALWAYS	
Series Description	(0008,103E)	AUTO	Same as Protocol Name	ALWAYS	
Protocol Name	(0018,1030)	AUTO	"Fusion3D3D"	ALWAYS	
Series Instance UID	(0020,000E)	AUTO	<new UID>	ALWAYS	
Series Number	(0020,0011)	AUTO	960	ALWAYS	
Request Attributes Sequence	(0040,0275)	AUTO	From Original	ANAP	
>item contents as provided			*From Original*		

Table 9-73: Registration: Spatial Registration Series Module

Attribute	Tag	Source	Value	Presence	Comments
Modality	(0008,0060)	AUTO	REG	ALWAYS	

Table 9-74: Registration: Frame of Reference Module

Attribute	Tag	Source	Value	Presence	Comments
Frame of Reference UID	(0020,0052)	AUTO	Copied from object to which the registration result applies. ***Note:*** In case of 2 volumes with 2 different FoR UIDs stored in same Series the related Registrations are also stored together in same series with FoR of the volume the first Registration is related to.	ALWAYS	
Position Reference Indicator	(0020,1040)	AUTO	If applicable, copied from original image (volume in registered space) to which the registration result applies.	VNAP	

Table 9-75: Registration: General Equipment Module

Attribute	Tag	Source	Value	Presence	Comments
Manufacturer	(0008,0070)	AUTO	“Siemens Healthineers”	ALWAYS	
Manufacturer's Model Name	(0008,1090)	AUTO	"syngo_Application_SW_SYS"	ALWAYS	
Institution Name	(0008,0080)	CONFIG	From configuration	ANAP	
Institution Address	(0008,0081)	CONFIG	From configuration	ANAP	
Station Name	(0008,1010)	CONFIG	From configuration	ANAP	
Device Serial Number	(0018,1000)	CONFIG	From configuration	ALWAYS	
Software Versions	(0018,1020)	AUTO	<product version of syngo Application Software>	ALWAYS	
Institutional Department Name	(0008,1040)	CONFIG	From configuration	ANAP	

Table 9-76: Registration: Spatial Registration Module

Attribute	Tag	Source	Value	Presence	Comments
Content Date	(0008,0023)	AUTO	<yyyymmdd>	ALWAYS	
Content Time	(0008,0033)	AUTO	<hhmmss.ffffff>	ALWAYS	
Instance Number	(0020,0013)	AUTO	1-n (start at a value of 1, increase by 1)	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
Content Label	(0070,0080)	AUTO		ALWAYS	
Content Description	(0070,0081)	AUTO/USER		ALWAYS	
Content Creator's Name	(0070,0084)	AUTO		ALWAYS	
Registration Sequence	(0070,0308)	AUTO	Two items, one "identity transformation" for the volume in the registered space, to which the volume specified in the second item, is registered to.	ALWAYS	
>Referenced Image Sequence	(0008,1140)	AUTO	Reference to the volume in the registered space	ANAP	
>Frame of Reference UID	(0020,0052)	AUTO	FoR of volume in the registered space	ALWAYS	
>Matrix Registration Sequence	(0070,0309)	AUTO		ALWAYS	
>>Matrix Sequence	(0070,030A)	AUTO		ALWAYS	
>>>Frame of Reference Transformation Matrix Type	(0070,030C)	AUTO		ALWAYS	
>>>Frame of Reference Transformation Matrix	(3006,00C6)	AUTO	"Identity transformation" specified	ALWAYS	
>>Registration Type Code Sequence	(0070,030D)	AUTO	(125021, DCM, "Frame of Reference Identity")	ALWAYS	
>Referenced Image Sequence	(0008,1140)	AUTO	Reference to the volume that is registered to the registered space	ANAP	
>Frame of Reference UID	(0020,0052)	AUTO	FoR of volume that is registered to the registered space	ALWAYS	
>Matrix Registration Sequence	(0070,0309)	AUTO		ALWAYS	
>>Matrix Sequence	(0070,030A)	AUTO		ALWAYS	
>>>Frame of Reference Transformation Matrix Type	(0070,030C)	AUTO		ALWAYS	
>>>Frame of Reference Transformation Matrix	(3006,00C6)	AUTO	"Identity transformation" specified	ALWAYS	
>>Registration Type Code Sequence	(0070,030D)	AUTO	(125025,DCM,"Visual Alignment")	ALWAYS	

Table 9-77: Registration: Common Instance Reference Module

Attribute	Tag	Source	Value	Presence	Comments
Referenced Series Sequence	(0008,1115)	AUTO	Used if both volumes are in same study. One item for each volume (registered space, registered volume)	ANAP	
>Referenced Instance Sequence	(0008,114A)	AUTO		ANAP	
>Series Instance UID	(0020,000E)	AUTO		ANAP	
Studies Containing Other Referenced Instances Sequence	(0008,1200)	AUTO	Used if both volumes are related to different studies.	ANAP	
>Referenced Series Sequence	(0008,1115)	AUTO		ANAP	
>>Referenced Instance Sequence	(0008,114A)	AUTO		ANAP	
>>Series Instance UID	(0020,000E)	AUTO		ANAP	
>Study Instance UID	(0020,000D)	AUTO		ANAP	

Table 9-78: Registration: SOP Common Module

Attribute	Tag	Source	Value	Presence	Comments
Specific Character Set	(0008,0005)	AUTO	From Original image (volume in registered space)	ANAP	
Instance Creation Date	(0008,0012)	AUTO	<yyyymmdd>	ALWAYS	
Instance Creation Time	(0008,0013)	AUTO	<hhmmss.ffffff>	ALWAYS	
SOP Class UID	(0008,0016)	AUTO	1.2.840.10008.5.1.4.1.1.66.1	ALWAYS	
SOP Instance UID	(0008,0018)	AUTO		ALWAYS	
Archive Requested	(0040,A494)	AUTO	YES, if object is stored with "To be archived"-status, NO if stored with "Not to be archived"-status.	ALWAYS	Standard Extended Attribute

9.1.1.7 Segmentation Standard Extended SOP Class

Please see the following tables for a complete overview of supplied Type 1/2/3 Standard and Private attributes:

Table 9-79: Segmentation Results from 3D Applications Modules

IE	Module	Reference	Presence of Module
Patient	Patient Module	Table 9-2	ALWAYS
Study	Study Modules	Table 9-3 Table 9-4	ALWAYS
Series	General Series	Table 9-80	ALWAYS

IE	Module	Reference	Presence of Module
	Segmentation Series	Table 9-81	ALWAYS
Equipment	General Equipment	Table 9-82	If respective attributes are configured
	Enhanced General Equipment	Table 9-83	ALWAYS
Image	General Image	Table 9-84	ALWAYS
	Image Pixel	Table 9-85	ALWAYS
	Segmentation Image	Table 9-86	ALWAYS
	Multi-frame Functional Groups	Table 9-87	ALWAYS
	Multi-frame Dimension	Table 9-88	ALWAYS
	Common Instance Reference	Table 9-89	ALWAYS
	SOP Common	Table 9-90	ALWAYS
	Private Segmentation	Table 9-91	ALWAYS

Table 9-80: Segmentation: General Series Module

Attribute	Tag	Source	Value	Presence	Comments
Series Date	(0008,0021)	AUTO	<yyyymmdd>	ALWAYS	
Series Time	(0008,0031)	AUTO	<hhmmss.ffffff>	ALWAYS	
Series Description	(0008,103E)	AUTO	Same as Protocol Name	ALWAYS	
Protocol Name	(0018,1030)	AUTO	Information on Segmentation	ALWAYS	
Series Instance UID	(0020,000E)	AUTO	<new UID>	ALWAYS	
Request Attributes Sequence	(0040,0275)	AUTO	From Original	ANAP	
>item contents as provided			*From Original*		

Table 9-81: Segmentation: Segmentation Series Module

Attribute	Tag	Source	Value	Presence	Comments
Modality	(0008,0060)	AUTO	SEG	ALWAYS	
Series Number	(0020,0011)	AUTO	From Original	ALWAYS	

Table 9-82: Segmentation: General Equipment Module

Attribute	Tag	Source	Value	Presence	Comments
Institution Name	(0008,0080)	CONFIG	From configuration	ANAP	
Institution Address	(0008,0081)	CONFIG	From configuration	ANAP	
Station Name	(0008,1010)	CONFIG	From configuration	ANAP	
Institutional Department Name	(0008,1040)	CONFIG	From configuration	ANAP	

Table 9-83: Segmentation: Enhanced General Equipment Module

Attribute	Tag	Source	Value	Presence	Comments
Manufacturer	(0008,0070)	AUTO	“Siemens Healthineers”	ALWAYS	
Manufacturer's Model Name	(0008,1090)	AUTO	"syngo_Application_SW_SYS"	ALWAYS	
Device Serial Number	(0018,1000)	CONFIG	From configuration	ALWAYS	
Software Versions	(0018,1020)	AUTO	<product version of syngo Application Software>	ALWAYS	

Table 9-84: Segmentation: General Image Module

Attribute	Tag	Source	Value	Presence	Comments
Acquisition Date	(0008,0022)	AUTO	From Original (0008,0021), if available	ANAP	
Acquisition Time	(0008,0032)	AUTO	From Original (0008,0031), if available	ANAP	
Content Date	(0008,0023)	AUTO	<yyyymmdd>	ALWAYS	
Content Time	(0008,0033)	AUTO	<hhmmss.ffffff>	ALWAYS	
Patient Orientation	(0020,0020)	AUTO	From Original	VNAP	
Image Comments	(0020,4000)	AUTO		VNAP	
Burned In Annotation	(0028,0301)	AUTO	NO	ALWAYS	
Icon Image Sequence	(0088,0200)	AUTO		ANAP	

Table 9-85: Segmentation: Image Pixel Module

Attribute	Tag	Source	Value	Presence	Comments
Rows	(0028,0010)	AUTO		ALWAYS	
Columns	(0028,0011)	AUTO		ALWAYS	
Pixel Data	(7FE0,0010)	AUTO		ALWAYS	

Table 9-86: Segmentation: Segmentation Image Module

Attribute	Tag	Source	Value	Presence	Comments
Image Type	(0008,0008)	AUTO	DERIVED\PRIMARY	ALWAYS	
Instance Number	(0020,0013)	AUTO	1-n (start at a value of 1, increase by 1)	ALWAYS	
Samples per Pixel	(0028,0002)	AUTO	1	ALWAYS	
Photometric Interpretation	(0028,0004)	AUTO	MONOCHROME2	ALWAYS	
Bits Allocated	(0028,0100)	AUTO	1	ALWAYS	
Bits Stored	(0028,0101)	AUTO	1	ALWAYS	
High Bit	(0028,0102)	AUTO	0	ALWAYS	
Pixel Representation	(0028,0103)	AUTO	0	ALWAYS	
Lossy Image Compression	(0028,2110)	AUTO	00	ALWAYS	
Segmentation Type	(0062,0001)	AUTO	BINARY	ALWAYS	
Segment Sequence	(0062,0002)	AUTO		ALWAYS	
>Anatomic Region Sequence	(0008,2218)	AUTO		ALWAYS	
>Segmented Property Category Code Sequence	(0062,0003)	AUTO	One of (T- 85756007, SCT, "Tissue"), (91723000, SCT, "Anatomical Structure"), (260787004, SCT, "Physical Object"), (49755003, SCT, "Morphologically Abnormal Structure"), (246464006, SCT, "Function") or private coded term.	ALWAYS	
>Segment Number	(0062,0004)	AUTO		ALWAYS	
>Segment Label	(0062,0005)	AUTO		ALWAYS	
>Segment Description	(0062,0006)	AUTO		ALWAYS	
>Segment Algorithm Type	(0062,0008)	AUTO		ALWAYS	
>Segment Algorithm Name	(0062,0009)	AUTO	One of 'Stroke Segmentation', 'Left Atrium Segmentation', 'Model Based Left Atrium Segmentation', 'Hybrid Model Based Left Atrium Segmentation', 'Aortic Root Segmentation',' Embolization Guidance Liver Lesion Segmentation',	ANAP	

Attribute	Tag	Source	Value	Presence	Comments
			'unknown' if Segment Algorithm Type is not MANUAL.		
>Recommended Display Grayscale Value	(0062,000C)	AUTO		ALWAYS	
>Recommended Display CIELab Value	(0062,000D)	AUTO		ALWAYS	
>Segmented Property Type Code Sequence	(0062,000F)	AUTO		ALWAYS	
Content Label	(0070,0080)	AUTO		ALWAYS	
Content Description	(0070,0081)	AUTO	Contains identifier to identify a related segmentation mesh result stored in a Surface Segmentation Object with same identifier.	VNAP	
Content Creator's Name	(0070,0084)	AUTO	<zero length>	EMPTY	

Table 9-87: Segmentation: Multi-frame Functional Groups Module

Attribute	Tag	Source	Value	Presence	Comments
Number of Frames	(0028,0008)	AUTO		ALWAYS	
Representative Frame Number	(0028,6010)	AUTO		ANAP	
Shared Functional Groups Sequence	(5200,9229)	AUTO		ALWAYS	
>Segmentation Identification Sequence	(0062,000A)	AUTO	1 item	ALWAYS	
>>Referenced Segment Number	(0062,000B)	AUTO		ALWAYS	
Per-frame Functional Groups Sequence	(5200,9230)	AUTO	1 item for each frame	ALWAYS	
>Derivation Image Sequence	(0008,9124)	AUTO		ALWAYS	
>>Source Image Sequence	(0008,2112)	AUTO		ALWAYS	
>>>Referenced SOP Class UID	(0008,1150)	AUTO		ALWAYS	
>>>Referenced SOP Instance UID	(0008,1155)	AUTO		ALWAYS	
>>>Referenced Frame Number	(0008,1160)	AUTO		ANAP	

Attribute	Tag	Source	Value	Presence	Comments
>>>Referenced Segment Number	(0062,000B)	AUTO		ANAP	
>>>Purpose of Reference Code Sequence	(0040,A170)	AUTO	(121322, DCM, "Source Image for Image Processing Operation")	ALWAYS	
>>Derivation Code Sequence	(0008,9215)	AUTO	(113076, DCM, "Segmentation")	ALWAYS	
>Frame Content Sequence	(0020,9111)	AUTO	1 item	ALWAYS	
>>Stack ID	(0020,9056)	AUTO		ALWAYS	
>>In-Stack Position Number	(0020,9057)	AUTO		ALWAYS	
>>Dimension Index Values	(0020,9157)	AUTO	1\2	ALWAYS	

Table 9-88: Segmentation: Multi-frame Dimension Module

Attribute	Tag	Source	Value	Presence	Comments
Dimension Organization Sequence	(0020,9221)	AUTO		ALWAYS	
>Dimension Organization UID	(0020,9164)	AUTO		ALWAYS	
Dimension Index Sequence	(0020,9222)	AUTO	2 items, 1 item for each index	ALWAYS	
Item 1					
>Dimension Index Pointer	(0020,9213)	AUTO	Set to tag of attribute Stack ID (0020,9056)	ALWAYS	
>Functional Group Pointer	(0020,9167)	AUTO	Set to tag of attribute Frame Content Sequence (0020,9111)	ALWAYS	
>Dimension Organization UID	(0020,9164)	AUTO	Same UID as above	ALWAYS	
Item 2					
>Dimension Index Pointer	(0020,9213)	AUTO	Set to tag of attribute In-Stack Position Number (0020,9057)	ALWAYS	
>Functional Group Pointer	(0020,9167)	AUTO	Set to tag of attribute Frame Content Sequence (0020,9111)	ALWAYS	
>Dimension Organization UID	(0020,9164)	AUTO	Same UID as above	ALWAYS	

Table 9-89: Segmentation: Common Instance Reference Module

Attribute	Tag	Source	Value	Presence	Comments
Referenced Series Sequence	(0008,1115)	AUTO	If this instance references instances in this study	ANAP	
>Referenced Instance Sequence	(0008,114A)	AUTO	Referenced instances of Surface Segmentation object, if applicable	ALWAYS	
>Series Instance UID	(0020,000E)	AUTO		ALWAYS	
Studies Containing Other Referenced Instances Sequence	(0008,1200)	AUTO	If this instance references instances in other studies	ANAP	
>Referenced Series Sequence	(0008,1115)	AUTO		ALWAYS	
>>Referenced Instance Sequence	(0008,114A)	AUTO	Referenced instances of Surface Segmentation object, if applicable	ALWAYS	
>>Series Instance UID	(0020,000E)	AUTO		ALWAYS	
>Study Instance UID	(0020,000D)	AUTO		ALWAYS	
Source Image Sequence	(0008,2112)	AUTO	Reference to the volume/slice object(s) used to generate this segmentation result	ALWAYS	
>Referenced SOP Class UID	(0008,1150)	AUTO		ALWAYS	
>Referenced SOP Instance UID	(0008,1155)	AUTO		ALWAYS	
>Purpose of Reference Code Sequence	(0040,A170)	AUTO	(121322, DCM, "Source Image for Image Processing Operation")	ALWAYS	
>Spatial Locations Preserved	(0028,135A)	AUTO		ALWAYS	
Derivation Code Sequence	(0008,9215)	AUTO	(113076, DCM, "Segmentation")	ALWAYS	

Table 9-90: Segmentation: SOP Common Module

Attribute	Tag	Source	Value	Presence	Comments
Specific Character Set	(0008,0005)	AUTO	From Original	ANAP	
Instance Creation Date	(0008,0012)	AUTO	<yyyymmdd>	ALWAYS	
Instance Creation Time	(0008,0013)	AUTO	<hhmmss.ffffff>	ALWAYS	
SOP Class UID	(0008,0016)	AUTO	1.2.840.10008.5.1.4.1.1.66.4	ALWAYS	
SOP Instance UID	(0008,0018)	AUTO		ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
Archive Requested	(0040,A494)	AUTO	YES, if object is stored with "To be archived"-status, NO if stored with "Not to be archived"-status.	ALWAYS	Standard Extended Attribute

Table 9-91: Segmentation: Private Segmentation Module

Attribute	Tag	Source	Value	Presence	Comments
Private Creator	(0063,00xx)	AUTO	"SIEMENS SMS-AX Segmentation Extensions"	ALWAYS	
Attributes according to 9.2 Data Dictionary of Private Attributes					

9.1.1.8 Surface Segmentation Standard Extended SOP Class

Please see the following tables for a complete overview of supplied Type 1/2/3 Standard and Private attributes:

Table 9-92: Surface Segmentation Results from 3D Graphic Results Storage Modules

IE	Module	Reference	Presence of Module
Patient	Patient Module	Table 9-2	ALWAYS
Study	Study Modules	Table 9-3 Table 9-4	ALWAYS
Series	General Series	Table 9-93	ALWAYS
	Segmentation Series	Table 9-94	ALWAYS
Frame of Reference	Frame of Reference	Table 9-95	ALWAYS
Equipment	General Equipment	Table 9-96	If respective attributes are configured
	Enhanced General Equipment	Table 9-97	ALWAYS
Surface	Surface Segmentation	Table 9-98	ALWAYS
	Surface Mesh	Table 9-99	ALWAYS
	Common Instance Reference	Table 9-100	ALWAYS
	SOP Common	Table 9-101	ALWAYS
	Private Surface Segmentation	Table 9-102	ALWAYS

Table 9-93: Surface Segmentation: General Series Module

Attribute	Tag	Source	Value	Presence	Comments
Series Date	(0008,0021)	AUTO	<yyyymmdd>	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
Series Time	(0008,0031)	AUTO	<hhmmss.ffffff>	ALWAYS	
Series Description	(0008,103E)	AUTO	Same as Protocol Name	ALWAYS	
Protocol Name	(0018,1030)	AUTO	Information on Surface Segmentation	ALWAYS	
Series Instance UID	(0020,000E)	AUTO	<new UID>	ALWAYS	
Request Attributes Sequence	(0040,0275)	AUTO	From Original	ANAP	
>item contents as provided			*From Original*		

Table 9-94: Surface Segmentation: Segmentation Series Module

Attribute	Tag	Source	Value	Presence	Comments
Modality	(0008,0060)	AUTO	SEG	ALWAYS	
Series Number	(0020,0011)	AUTO	950	ALWAYS	

Table 9-95: Surface Segmentation: Frame of Reference Module

Attribute	Tag	Source	Value	Presence	Comments
Frame of Reference UID	(0020,0052)	AUTO	Copied from object to which the Surface Segmentation result applies or new UID. ***Note***: In case of 2 volumes with 2 different FoR UIDs stored in same Series the related SSOs are also stored together in same series with FoR of the volume the first SSO is related to.	ALWAYS	
Position Reference Indicator	(0020,1040)	AUTO	If applicable, copied from object to which the Surface Segmentation result applies	VNAP	

Table 9-96: Surface Segmentation: General Equipment Module

Attribute	Tag	Source	Value	Presence	Comments
Institution Name	(0008,0080)	CONFIG	From configuration	ANAP	
Institution Address	(0008,0081)	CONFIG	From configuration	ANAP	
Station Name	(0008,1010)	CONFIG	From configuration	ANAP	

Table 9-97: Surface Segmentation: Enhanced General Equipment Module

Attribute	Tag	Source	Value	Presence	Comments
Manufacturer	(0008,0070)	AUTO	“Siemens Healthineers”	ALWAYS	
Manufacturer's Model Name	(0008,1090)	AUTO	"syngo_Application_SW_SYS"	ALWAYS	
Device Serial Number	(0018,1000)	CONFIG	From configuration	ALWAYS	
Software Versions	(0018,1020)	AUTO	<product version of syngo Application Software>	ALWAYS	

Table 9-98: Surface Segmentation: Surface Segmentation Module

Attribute	Tag	Source	Value	Presence	Comments
Content Date	(0008,0023)	AUTO	<yyyymmdd>	ALWAYS	
Content Time	(0008,0033)	AUTO	<hhmmss>	ALWAYS	
Instance Number	(0020,0013)	AUTO	1-n (start at a value of 1, increase by 1)	ALWAYS	
Segment Sequence	(0062,0002)	AUTO		ALWAYS	
>Anatomic Region Sequence	(0008,2218)	AUTO		ALWAYS	
>Segmented Property Category Code Sequence	(0062,0003)	AUTO	One of (T- 85756007, SCT, "Tissue"), (91723000, SCT, "Anatomical Structure"), (260787004, SCT, "Physical Object"), (49755003, SCT, "Morphologically Abnormal Structure"), (246464006, SCT, "Function"), (309825002, SCT, “Spatial and Relational Concept”), (91720002, SCT, “Body Substance”), (195590001, SCT, “Substance), (65818007, SCT, “Stent”) (extended) or private coded term.	ALWAYS	
>Segment Number	(0062,0004)	AUTO		ALWAYS	
>Segment Label	(0062,0005)	AUTO/USER		ALWAYS	
>Segment Description	(0062,0006)	AUTO		ANAP	
>Segment Algorithm Type	(0062,0008)	AUTO		ALWAYS	
>Segmented Property Type Code Sequence	(0062,000F)	AUTO		ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
>Surface Count	(0066,002A)	AUTO	Number of Surfaces comprising this segment	ALWAYS	
>Referenced Surface Sequence	(0066,002B)	AUTO		ALWAYS	
>>Referenced Surface Number	(0062,002C)	AUTO		ALWAYS	
>>Segment Surface Generation Algorithm Identification Sequence	(0066,002D)	AUTO		ALWAYS	
>>>Algorithm Family Code Sequence	(0062,002F)	AUTO		ALWAYS	
>>>Algorithm Version	(0066,0031)	AUTO		ALWAYS	
>>>Algorithm Name	(0066,0036)	AUTO	Identifies workflow/application	ALWAYS	
>>Segmented Surface Source Instance Sequence	(0066,002E)	AUTO	Reference to volume that was viewed while generating this surface segment	ALWAYS	
>>>Referenced SOP Class UID	(0008,1150)	AUTO		ALWAYS	
>>>Referenced SOP Instance UID	(0008,1155)	AUTO		ALWAYS	
>>>Referenced Frame Number	(0008,1160)	AUTO		ANAP	
Content Label	(0070,0080)	AUTO		ALWAYS	
Content Description	(0070,0081)	AUTO		ALWAYS	
Content Creator's Name	(0070,0084)	AUTO	<zero length>	EMPTY	

Table 9-99: Surface Segmentation: Surface Mesh Module

Attribute	Tag	Source	Value	Presence	Comments
Number of Surfaces	(0066,0001)	AUTO		ALWAYS	
Surface Sequence	(0066,0002)	AUTO	One item for each surface	ALWAYS	
>Recommended Display Grayscale Value	(0062,000C)	AUTO		ALWAYS	
>Recommended Display CIELab Value	(0062,000D)	AUTO/USER		ALWAYS	
>Surface Number	(0066,0003)	AUTO		ALWAYS	
>Surface Comments	(0066,0004)	AUTO/USER		ALWAYS	
>Surface Processing	(0066,0009)	AUTO	Typically set to NO	ALWAYS	
>Recommended Presentation Opacity	(0066,000C)	AUTO/USER	0.0 specifies 100% transparency and 1.0 a 100% opaqueness.	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
>Recommended Presentation Type	(0066,000D)	AUTO/USER	DICOM defined values: SURFACE WIREFRAME POINTS Private terms: CONTOUR (only contour of a wireframe) XRAY_SHADE CARVING (mesh faces pointed toward the eyepoint are removed) NONE	ALWAYS	
>Finite Volume	(0066,000E)	AUTO		ALWAYS	
>Manifold	(0066,0010)	AUTO		ALWAYS	
>Surface Points Sequence	(0066,0011)	AUTO		ALWAYS	
>>Number of Surface Points	(0066,0015)	AUTO		ALWAYS	
>>Point Coordinates Data	(0066,0016)	AUTO		ALWAYS	
>Surface Points Normals Sequence	(0066,0012)	AUTO		VNAP	
>Surface Mesh Primitives Sequence	(0066,0013)	AUTO	Only one item	ALWAYS	
>>Long Triangle Point Index List	(0066,0041)	AUTO		VNAP	
>>Long Edge Point Index List	(0066,0042)	AUTO	Typically not used	VNAP	
>>Long Vertex Point Index List	(0066,0043)	AUTO		VNAP	
>>Triangle Strip Sequence	(0066,0026)	AUTO	Typically not used	VNAP	
>>Triangle Fan Sequence	(0066,0027)	AUTO	Typically not used	VNAP	
>>Line Sequence	(0066,0028)	AUTO		VNAP	
>>>Long Primitive Point Index List	(0066,0040)	AUTO		ANAP	
>>Facet Sequence	(0066,0034)	AUTO	Typically not used	VNAP	
>Recommended Point Radius	(0066,0037)	AUTO		ANAP	
>Recommended Line Thickness	(0066,0038)	AUTO		ANAP	

Table 9-100: Surface Segmentation: Common Instance Reference Module

Attribute	Tag	Source	Value	Presence	Comments
Referenced Series Sequence	(0008,1115)	AUTO	If this instance references instances in this study	ANAP	
>Referenced Instance Sequence	(0008,114A)	AUTO	Referenced instances of Segmentation object, if applicable	ALWAYS	
>Series Instance UID	(0020,000E)	AUTO		ALWAYS	
Studies Containing Other Referenced Instances Sequence	(0008,1200)	AUTO	If this instance references instances in other studies	ANAP	
>Referenced Series Sequence	(0008,1115)	AUTO		ALWAYS	
>>Referenced Instance Sequence	(0008,114A)	AUTO	Referenced instances of Segmentation object, if applicable	ALWAYS	
>>Series Instance UID	(0020,000E)	AUTO		ALWAYS	
>Study Instance UID	(0020,000D)	AUTO		ALWAYS	

Table 9-101: Surface Segmentation: SOP Common Module

Attribute	Tag	Source	Value	Presence	Comments
Specific Character Set	(0008,0005)	AUTO	From Original	ANAP	
Instance Creation Date	(0008,0012)	AUTO	<yyyymmdd>	ALWAYS	
Instance Creation Time	(0008,0013)	AUTO	<hhmmss.ffffff>	ALWAYS	
SOP Class UID	(0008,0016)	AUTO	1.2.840.10008.5.1.4.1.1.66.5	ALWAYS	
SOP Instance UID	(0008,0018)	AUTO		ALWAYS	
Archive Requested	(0040,A494)	AUTO	YES, if object is stored with "To be archived"-status, NO if stored with "Not to be archived"-status.	ALWAYS	Standard Extended Attribute

Table 9-102: Surface Segmentation: Private Surface Segmentation Module

Attribute	Tag	Source	Value	Presence	Comments
Private Creator	(0067,00xx)	AUTO	"SIEMENS SMS-AX Surface Segmentation Extensions"	ALWAYS	
Attributes according to 9.2 Data Dictionary of Private Attributes					

9.2 Data Dictionary of Private Attributes

Table 9-103 lists private attributes which may be included in instances generated by the *syngo* Application Software. These private attributes may be deprecated or replaced with standard attributes in the future.

Table 9-103: Private Data Element Dictionary

DICOM Tag	Name	VR	VM
(0019,SIEMENS SMS-AX IAE,00)	Bookmark XML Structure	OB	1
(0019,SIEMENS AX DYNACT,02)	Transformation to Calibration	DS	16
(0019,SIEMENS AX DYNACT,03)	Calibration Coordinate System ID	US	1-n
(0019,SIEMENS AX DYNACT,10)	Reconstruction Joblist	UT	1
(0019,SIEMENS AX DYNACT,11)	HU Offset Correction Perfusion	FL	1
(0019,SIEMENS AX DYNACT,12)	Plane Identification	CS	1
(0021,SIEMENS SMS-AX ACQ 1.0,54) *(Note)*	Rotation Angle	SS	1
(0021,SIEMENS SMS-AX ACQ 1.0,56)	Table Coordinates	SS	3
(0021,SIEMENS SMS-AX ACQ 1.0,74)	Iso Center Table Position	SS	1
(0021,SIEMENS SMS-AX ACQ 1.0,5B)	Table Coordinates System	FL	12
(0021,SIEMENS SMS-AX ACQ 1.0,81)	Table Tilt	SS	1
(0021,SIEMENS SMS-AX ACQ 1.0,82)	Table Rotation	SS	1
(0021,SIEMENS SMS-AX ACQ 1.0,83)	Table Cradle Tilt	SS	1
(0029,SIEMENS MEDCOM HEADER,40)	Application Header Sequence	SQ	1
(0029,SIEMENS MEDCOM HEADER,41)	Application Header Type	CS	1
(0029,SIEMENS MEDCOM HEADER,42)	Application Header ID	LO	1
(0029,SIEMENS MEDCOM HEADER,43)	Application Header Version	LO	1
(0029,SIEMENS MEDCOM HEADER,44)	Application Header Info	OB	1
(0063,SIEMENS SMS-AX Segmentation Extensions,42)	Object GUID	LO	1
(0063,SIEMENS SMS-AX Segmentation Extensions,43)	SO Margin	SQ	1
(0063,SIEMENS SMS-AX Segmentation Extensions,44)	Segmentation Type	SQ	1
(0063,SIEMENS SMS-AX Segmentation Extensions,48)	Private Segmentation Sequence	SQ	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,00)	Object Type	CS	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,01)	Object IAE Display	CS	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,02)	Object Live Display	CS	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,04)	SSO Version Number	US	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,05)	EP Point Ablated	CS	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,10)	Polyline Shape	CS	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,11)	Polyline Style	CS	1

DICOM Tag	Name	VR	VM
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,13)	Clipping	CS	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,27)	Object Volume Assignment	CS	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,35)	Group Show	CS	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,36)	Group IAE Display	CS	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,37)	Group Live Display	CS	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,38)	Group Volume Assignment	CS	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,39)	Object Version Number	US	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,40)	SSO Owner	LO	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,42)	Object GUID	LO	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,43)	Group GUID	LO	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,44)	SSO GUID	LO	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,47)	Group Sequence	SQ	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,48)	Private Surface Segmentation Sequence	SQ	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,49)	Group Name	LO	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,51)	Referenced Group GUID	LO	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,53)	Private Surface Mesh Sequence	SQ	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,54)	Surface Show	CS	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,56)	Surface Mean Diameter List	OF	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,57)	Primary Angle	DS	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,58)	Secondary Angle	DS	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,59)	Centerline ID List	LT	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,60)	Landmark ID List	LT	1

DICOM Tag	Name	VR	VM
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,61)	Surface Text Label	LO	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,62)	Centerline Visualization Type	CS	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,64)	MPR Views	UT	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,65)	Fixed Line Thickness	CS	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,66)	Fixed Point Radius	CS	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,67)	Surface Supported	CS	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,68)	Referenced Object GUID	LO	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,69)	Show Caption	CS	1-n
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,71)	SSO Measurement XML	UT	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,72)	Detailed Surface	CS	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,74)	Interpretation Hints	CS	1-n
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,75)	SSO Margin	FL	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,76)	Object Links	UT	1
(0067,SIEMENS SMS-AX Surface Segmentation Extensions,77)	HU Thresholds	LT	1

Note: The following Private Owner Code contains double-spaces in the name definitions: SIEMENS SMS-AX<spc><spc>ACQ 1.0

Interpretation of the DICOM Tags from the above table:
(gggg,pp,ee) -> (gggg,ppee)
gggg - odd group number
pp - private creator identification code
ee - private element

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