DICOM Conformance Statement

Application Annex:

HeartNavigator Rel. 3.1
On Interventional Workspot R1.5

ICAP-T-030001.09b

Corresponds to ICAP-W-030001.02

PHILIPS

Issued by:

Philips Medical Systems Nederland BV, a Philips Healthcare company,

P.O. Box 10.000
5680 DA Best
The Netherlands

Internet: www.philips.com/dicom

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1. Introduction

This DICOM Conformance Statement annex is applicable to HeartNavigator Rel. 3.1 hosted on Interventional Workspot, later referred to as HeartNavigator Application. HeartNavigator Application is a tool to assist cardiac surgeons and interventional cardiologist with the treatment of structural heart diseases using minimal invasive interventional techniques. It enables the use of previously acquired DICOM cardiac CT data of the patient in conjunction with the X-ray image data from the Philips Interventional X-ray system to perform the procedure.
In the procedure planning phase, the HeartNavigator Application provides the user with the means to:

- Identify and visualize relevant anatomical structures in the CT data.
- Plan and create an overview of optimal X-ray projection angles for use during the procedure.
- Evaluate the placement of the device.
- Create snapshots of the viewing area of the HeartNavigator Application for later use (e.g, reporting).

During the procedure, the HeartNavigator Application provides the user with the means to:

- Visualize the relevant anatomical structures in the CT data.
- Recall the planned X-ray projection angles on the Philips Interventional X-ray system.
- See the 3D visualization of the CT data overlaid with the live X-ray images from the Philips Interventional X-ray system.
- Create snapshots and movies of the viewing area of the HeartNavigator Application for later use (e.g, reporting)

HeartNavigator Rel. 3.1 includes the following workflows:

- TAVI (Transcatheter Aortic Valve Implementation)
- SHD (Structural Heart Disease)

The DICOM implementation described in this document is applicable for TAVI and SHD.

1.1. Revision History

The revision history below provides dates and differences among individual document versions.

Table 1: Revision History

Document Version	Date of Issue	Status	Description
00	19-Sep-2018	Authorized	Final Version for HeartNavigator Rel 3.1 on Interventional Workspot R1.5

1.2. Terminology

DICOM	Digital Imaging and Communications in Medicine
IOD	Information Object Definition
UID	Unique Identifier
VR	Value Representation
TAVI	Transcatheter Aortic Valve Implementation
TAVR	Transcatheter Aortic Valve Replacement
SHD	Structural Heart Disease
IW	Interventional Workspot

2. Data Specifications

2.1. Supported IOD's

This section specifies each IOD accepted and / or created by HeartNavigator Application.

ACCEPTED The applicable IOD is accepted for storage in the repository of the hosting platform and supported for import in HeartNavigator Application for viewing and analysis.

CREATED The HeartNavigator Application supports generation of derived data by using the applicable IOD and is able to store this data in the repository of the hosting platform.

Table 2: Supported IOD's

IOD		Support	
Name	**UID**	**ACCEPTED**	**CREATED**
X-Ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1	Yes*	Yes
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2	Yes	No
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Yes***	Yes**
Multiframe True Color Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7.4	No	Yes

** Note: HeartNavigator only accepts XA runs that were received via Real Time Link connection during the Registration and Live tasks from the Philips Interventional X-Ray systems. Only these XA runs can be recalled when the study is imported again in the HeartNavigator TAVI and SHD workflows.*

*** Note: The following Secondary Capture Images can be created in the HeartNavigator applications:*

- *DICOM snapshots containing a screencapture of the Segmentation, Measurement, Planning, Registration or Live worksteps*
- *Report of the Measurement and Planning worksteps*
- *Session object with results of the several HeartNavigator worksteps (automatically created when the HeartNavigator application is closed.*

**** Only the Secondary Capture objects containing the HeartNavigator sessions information can be used as input. (DICOM snapshots and the measurement/planning report cannot be used as input)*

2.1.1. Acceptance Criteria

This section specifies the acceptance criteria applied by HeartNavigator Application to which a dataset should adhere before it can be imported into the application. This can be criteria on the highest level (e.g. data from a certain manufacturer or system model) or certain DICOM attributes mandatory to be present into the dataset holding a specific value. In case one or more Philips private attributes are required, then a list of supported Philips system models will be mentioned.

Table 3: Accepted system models.

Manufacturer	Modality	System Model Name(s)
Philips	CT	Brilliance scanners
	CT	iCT scanners
	CT	Ingenuity scanners
General Electric	CT	Lightspeed 16, 16Pro, VCT Select (32), VCT (64)
Siemens	CT	Definition
	CT	Sensation 16, 64 (32 channels)
Toshiba	CT	Acquilion One

Table 4: Accepted transfer syntaxes per IOD

IOD		Transfer Syntax	
Name	**UID**	**Name**	**UID**
N.A	N.A	N.A	N.A

Remark: the acceptance of the transfer syntaxes per IOD is handled by the IW platform. See DCS of IW for the details of the supported transfer syntaxes.

Table 5: Accepted attribute values for CT image storage SOP

Attribute Name	Attribute Number	Values / Comments
SOP Class UID	0008,0016	1.2.840.10008.5.1.4.1.1.2
Bits Allocated	0028,0100	16

The 3D volumetric CT datasets shall have the following characteristics:

1. The pixel spacing for each slice in both directions in the series is equal, i.e. square pixels (this is always the case for original datasets)
2. The series contains at least 4 slices (512x512 voxels of 2 bytes each) with a different slice location
3. All slices must have the same dimensions
4. The distance between all slices must be equal
5. In case the CT series contains only one volume (i.e. no multiphase volumes or volumes under different orientations) the user can select a volume to start the application with. In case the CT series is selected to start the application, the most recent / first volume is selected.
6. The CT series must be contrast enhanced (this is however not explicitly checked by HeartNavigator)

When using DERIVED DICOM data sets, the application may not work correctly. The end user is advised not to use this type of data sets via the Derived Dataset message; this message is only shown when no session data is available.

When using a data set with more than 1600 slices, the application may show reduced performance. The end user is advised not to use such large data sets via the Large Dataset message; this message is only shown when no session data is available.

2.1.2. Contents of Created IOD's

This section specifies in detail the attribute contents of created data objects. Attributes are grouped together by its corresponding module as specified by DICOM standard. Philips private attributes are excluded for specification.

Abbreviations used in the Module table for the column "Presence of Value" are:

ALWAYS	The attribute is always present with a value
EMPTY	The attribute is always present without any value (attribute sent zero length)
VNAP	The attribute is always present and its Value is Not Always Present (attribute sent zero length if no value is present)
ANAP	The attribute is present under specified condition – if present then it will always have a value

The abbreviations used in the Module table for the column "Source" are:

AUTO	The attribute value is generated automatically
CONFIG	The attribute value source is a configurable parameter
COPY	The attribute value source is another SOP instance
FIXED	The attribute value is hard-coded in the application
IMPLICIT	The attribute value source is a user-implicit setting
MPPS	The attribute value is the same as that use for Modality Performed Procedure Step
MWL	The attribute value source is a Modality Worklist
USER	The attribute value source is explicit user input

2.1.2.1. List of created SOP Classes

Table 6: List of created SOP Classes

SOP Class Name	SOP Class UID
X-Ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7
Multiframe True Color Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7.4

2.1.2.2. X-Ray Angiographic Image Storage SOP Class

Table 7: IOD of Created X-Ray Angiographic Image Storage Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS (the content of these modules is copied from the source CT study)
Study	General Study Module	ALWAYS (the content of these modules is copied from the source CT study)
	Patient Study Module	ALWAYS (the content of these modules is copied from the source CT study)
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Image	General Image Module	ALWAYS
	Image Pixel Module	ALWAYS
	Cine Module	ALWAYS
	Multi-Frame Module	ALWAYS
	Display Shutter Module	ALWAYS
	X-Ray Image Module	ALWAYS
	X-Ray Acquisition Module	ALWAYS
	X-Ray Table Module	ALWAYS
	XA Positioner Module	ALWAYS
	DX Detector Module	ALWAYS
	VOI LUT Module	ALWAYS
	SOP Common Module	ALWAYS

Table 8: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Referenced Patient Sequence	0008,1120	SQ		ANAP	COPY	
Patient's Name	0010,0010	PN		VNAP	COPY	
Patient ID	0010,0020	LO		VNAP	COPY	
Patient's Birth Date	0010,0030	DA		VNAP	COPY	
Patient's Sex	0010,0040	CS		VNAP	COPY	

Table 9: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		VNAP	COPY	
Study Time	0008,0030	TM		VNAP	COPY	
Accession Number	0008,0050	SH		VNAP	COPY	
Referring Physician's Name	0008,0090	PN		VNAP	COPY	

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Description	0008,1030	LO		VNAP	COPY	
Procedure Code Sequence	0008,1032	SQ		ANAP	COPY	
> Code Value	0008,0100	SH		ALWAYS	COPY	
> Coding Scheme Designator	0008,0102	SH		ALWAYS	COPY	
> Code Meaning	0008,0104	LO		ALWAYS	COPY	
Name Of Physicians Reading Study	0008,1060	PN		VNAP	COPY	
Referenced Study Sequence	0008,1110			ANAP	COPY	
Study Instance UID	0020,000D	UI		ALWAYS	COPY	
Study ID	0020,0010	SH		VNAP	COPY	

Table 10: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Age	0010,1010	AS		ANAP	COPY	
Patient's Size	0010,1020	DS		ANAP	COPY	
Patient's Weight	0010,1030	DS		ANAP	COPY	

Table 11: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ALWAYS	COPY	copied from source data
Series Time	0008,0031	TM		ALWAYS	COPY	copied from source data
Modality	0008,0060	CS	XA	ALWAYS	FIXED	
Series Description	0008,103E	LO		VNAP	COPY	
Performing Physician's Name	0008,1050	PN		VNAP	COPY	
Related Series Sequence	0008,1250	SQ		VNAP	COPY	
>Study Instance UID	0020,000D	UI		ALWAYS	COPY	
>Series Instance UID	0020,000E	UI		ALWAYS	COPY	
>Purpose of Reference Code Sequence	0040,A170	SQ		VNAP	COPY	
Series Instance UID	0020,000E	UI		ALWAYS	COPY	copied from source data
Series Number	0020,0011	IS		ALWAYS	COPY	copied from source data
Performed Procedure Step Start Date	0040,0244	DA		ANAP	COPY	
Performed Procedure Step Start Time	0040,0245	TM		ANAP	COPY	
Performed Procedure Step ID	0040,0253	SH		ANAP	COPY	

Table 12: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips	ALWAYS	COPY	copied from source data
Institution Name	0008,0080	LO		VNAP	COPY	

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer's Model Name	0008,1090	LO	HeartNavigator - SHD or HeartNavigator - TAVI	ALWAYS	AUTO	Value depends on the HeartNavigator workflow that has received the XA run.
Device Serial Number	0018,1000	LO		VNAP	CONFIG	
Software Versions	0018,1020	LO	3.1.x	VNAP	AUTO	where “x” is the detailed application SW version.

Table 13: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	ORIGINAL\ PRIMARY\ SINGLE PLANE	ALWAYS	COPY	
Acquisition Date	0008,0022	DA		VNAP	COPY	
Content Date	0008,0023	DA		VNAP	COPY	copied from source data
Acquisition Time	0008,0032	TM		VNAP	COPY	
Content Time	0008,0033	TM		VNAP	COPY	copied from source data
Instance Number	0020,0013	IS		VNAP	COPY	copied from source data
Patient Orientation	0020,0020	CS		VNAP	COPY	copied from source data
Lossy Image Compression	0028,2110	CS	00	ALWAYS	COPY	copied from source data
Icon Image Sequence	0088,0200	SQ		ALWAYS	COPY	copied from source data
>Samples per Pixel	0028,0002	US	1	ALWAYS	COPY	copied from source data
>Photometric Interpretation	0028,0004	CS	MONOCHROME2	ALWAYS	COPY	copied from source data
>Rows	0028,0010	US	128	ALWAYS	FIXED	
>Columns	0028,0011	US	128	ALWAYS	FIXED	
>Bits Allocated	0028,0100	US	8	ALWAYS	FIXED	
>Bits Stored	0028,0101	US	8	ALWAYS	FIXED	
>High Bit	0028,0102	US	7	ALWAYS	FIXED	
>Pixel Representation	0028,0103	US	0	ALWAYS	FIXED	
>Pixel Data	7FE0,0010	OB		ALWAYS	COPY	copied from source data

Table 14: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US	1	ALWAYS	COPY	
Photometric Interpretation	0028,0004	CS	MONOCHROME2	ALWAYS	COPY	
Rows	0028,0010	US		ALWAYS	COPY	
Columns	0028,0011	US		ALWAYS	COPY	
Bits Allocated	0028,0100	US	16	ALWAYS	FIXED	
Bits Stored	0028,0101	US	16	ALWAYS	FIXED	
High Bit	0028,0102	US	15	ALWAYS	COPY	
Pixel Representation	0028,0103	US	0	ALWAYS	COPY	
Pixel Data	7FE0,0010	OB/ OW		ALWAYS	COPY	copied from source data

Table 15: Cine Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Cine Rate	0018,0040	IS		VNAP	COPY	
Frame Time	0018,1063	DS		ALWAYS	COPY	

Table 16: Multi-Frame Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Number of Frames	0028,0008	IS		ALWAYS	COPY	
Frame Increment Pointer	0028,0009	AT	00181063	ALWAYS	COPY	

Table 17: Display Shutter Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Shutter Shape	0018,1600	CS	RECTANGULAR	ALWAYS	COPY	
Shutter Left Vertical Edge	0018,1602	IS		ALWAYS	COPY	
Shutter Right Vertical Edge	0018,1604	IS		ALWAYS	COPY	
Shutter Upper Horizontal Edge	0018,1606	IS		ALWAYS	COPY	
Shutter Lower Horizontal Edge	0018,1608	IS		ALWAYS	COPY	

Table 18: X-Ray Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	ORIGINAL\ PRIMARY\ SINGLE PLANE	ALWAYS	FIXED	
Samples per Pixel	0028,0002	US	1	ALWAYS	FIXED	
Photometric Interpretation	0028,0004	CS	MONOCHROME2	ALWAYS	FIXED	
Frame Increment Pointer	0028,0009	AT	00181063	ALWAYS	FIXED	
Bits Allocated	0028,0100	US	16	ALWAYS	FIXED	
Bits Stored	0028,0101	US	16	ALWAYS	FIXED	
High Bit	0028,0102	US	15	ALWAYS	FIXED	
Pixel Representation	0028,0103	US	0	ALWAYS	FIXED	
Pixel Intensity Relationship	0028,1040	CS	LIN	ALWAYS	FIXED	
Lossy Image Compression	0028,2110	CS	00	ALWAYS	FIXED	

Table 19: X-Ray Acquisition Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
KVP	0018,0060	DS		ALWAYS	COPY	
Exposure	0018,1152	IS		ALWAYS	COPY	
Radiation Setting	0018,1155	CS	SC	ALWAYS	COPY	
Imager Pixel Spacing	0018,1164	DS		ALWAYS	COPY	
Pixel Spacing	0028,0030	DS		ANAP	COPY	

Table 20: X-Ray Table Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Table Motion	0018,1134	CS	STATIC	VNAP	COPY	
Table Angle	0018,1138	DS		ANAP	COPY	

Table 21: XA Positioner Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Distance Source to Patient	0018,1111	DS		ANAP	COPY	
Distance Source to Patient	0018,1111	DS		ANAP	COPY	
Positioner Motion	0018,1500	CS		ANAP	COPY	
Positioner Primary Angle	0018,1510	DS		VNAP	COPY	
Positioner Secondary Angle	0018,1511	DS		VNAP	COPY	
Positioner Primary Angle Increment	0018,1520	DS		ANAP	COPY	
Positioner Secondary Angle Increment	0018,1521	DS		ANAP	COPY	

Table 22: DX Detector Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Imager Pixel Spacing	0018,1164	DS		ALWAYS	COPY	
Pixel Spacing	0028,0030	DS		ANAP	COPY	

Table 23: VOI LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Window Center	0028,1050	DS		ALWAYS	COPY	
Window Width	0028,1051	DS		ALWAYS	COPY	

Table 24: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Creation Date	0008,0012	DA		ALWAYS	COPY	copied from source data
Instance Creation Time	0008,0013	TM		ALWAYS	COPY	copied from source data
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.12.1	ALWAYS	FIXED	
SOP Instance UID	0008,0018	UI		ALWAYS	COPY	copied from source data
Instance Number	0020,0013	IS		ALWAYS	COPY	copied from source data

2.1.2.3. Secondary Capture Image Storage SOP class

Table 25: IOD of Created Secondary Capture Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS (the content of these modules is copied from the source CT study)
Study	General Study Module	ALWAYS (the content of these modules is copied from the source CT study)

	Patient Study Module	ALWAYS (the content of these modules is copied from the source CT study)
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
	SC Equipment Module	ALWAYS
Image	General Image Module	ALWAYS
	Image Pixel Module	ALWAYS
	SC Image Module	CONDITIONAL (not present in session objects)
	VOI LUT Module	CONDITIONAL (only present in session objects)
	SOP Common Module	ALWAYS

Table 26: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Referenced Patient Sequence	0008,1120	SQ		ANAP	COPY	
Patient's Name	0010,0010	PN		VNAP	COPY	
Patient ID	0010,0020	LO		ALWAYS	COPY	
Patient's Birth Date	0010,0030	DA		ALWAYS	COPY	
Patient's Sex	0010,0040	CS		ALWAYS	COPY	

Table 27: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		ALWAYS	COPY	
Study Time	0008,0030	TM		ALWAYS	COPY	
Accession Number	0008,0050	SH		VNAP	COPY	
Referring Physician's Name	0008,0090	PN		VNAP	COPY	
Study Description	0008,1030	LO		VNAP	COPY	
Procedure Code Sequence	0008,1032	SQ		ANAP	COPY	
> Code Value	0008,0100	SH		ANAP	COPY	
>Coding Scheme Designator	0008,0102	SH		ANAP	COPY	
>Code Meaning	0008,0104	LO		ANAP	COPY	
Name of Physicians Reading Study	0008,1060	PN		ANAP	COPY	
Referenced Study Sequence	0008,1110	SQ		ANAP	COPY	
Study Instance UID	0020,000D	UI		ALWAYS	COPY	
Study ID	0020,0010	SH		ALWAYS	COPY	

Table 28: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Age	0010,1010	AS		ANAP		
Patient's Size	0010,1020	DS		ANAP		
Patient's Weight	0010,1030	DA		ANAP		

Table 29: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment

Series Date	0008,0021	DA		ALWAYS	COPY	copied from source data
Series Time	0008,0031	TM		ALWAYS	COPY	copied from source data
Modality	0008,0060	CS	XA	ALWAYS	AUTO	In snapshots and session objects
			DOC			In report
Series Description	0008,103E	LO	Snapshot_Movie	ALWAYS	AUTO	In DICOM snapshot
			Session			In session object
			Planning and Measurement Report			In report
Related Series Sequence	0008,1250	SQ		ANAP	COPY	copied from source data
>Study Instance UID	0020,000D	UI		ALWAYS	COPY	
>Series Instance UID	0020,000E	UI		ALWAYS	COPY	
>Purpose of Reference Code Sequence	0040,A170	SQ		EMPTY		
Series Instance UID	0020,000E	UI		ALWAYS	COPY	copied from source data
Series Number	0020,0011	IS		ALWAYS	COPY	copied from source data
Performed Procedure Step Start Date	0040,0244	DA		ANAP	COPY	Not present in session object
Performed Procedure Step Start Time	0040,0245	TM		ANAP	COPY	Not present in session object
Performed Procedure Step ID	0040,0253	SH		ANAP	COPY	
Request Attribute Sequence	0040,0275	SQ		ANAP	COPY	
> Scheduled Procedure Step ID	0040,0009	SH		ANAP	COPY	
> Requested Procedure ID	0040,1001	SH		ANAP	COPY	

Table 30: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070		Philips	VNAP	FIXED	
Manufacturer's Model Name	0008,1090	LO	HeartNavigator – TAVI or HeartNavigator - SHD	ALWAYS	FIXED	Value depends on the HeartNavigator workflow that has created the object.
Device Serial Number	0018,1000	LO		VNAP	CONFIG	
Software Versions	0018,1020	LO	3.1.x	ALWAYS	FIXED	where "x" is the detailed application SW version.

Table 31: SC Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS	XA	ALWAYS	FIXED	In snapshots and session objects
Conversion Type	0008,0064	CS	WSD	ALWAYS	FIXED	

Table 32: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	DERIVED\SECONDARY	ALWAYS	AUTO	In snapshots

			DERIVED\SECONDARY\ - SESSION - SEGMENTATION - VOLREF NONSEGMENTATION			In session objects
			DERIVED\SECONDARY\REPORT			In report
Content Date	0008,0023	DA		ANAP	AUTO	Not present in session object
Content Time	0008,0033	TM		ANAP	AUTO	Not present in session object
Instance Number	0020,0013	IS		ALWAYS	AUTO	
Patient Orientation	0020,0020	CS		VNAP	AUTO	

Table 33: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US	3	ALWAYS	FIXED	
Photometric Interpretation	0028,0004	CS	MONOCHROME1/ RGB	ALWAYS	FIXED	RGB is used in Snapshots and reports MONOCHROME1 is used in session objects
Planar Configuration	0028,0006	US	0	ANAP	FIXED	Not present in session object.
Rows	0028,0010	US		ALWAYS	AUTO	Value = 1 in session object
Columns	0028,0011	US		ALWAYS	AUTO	Value = 1 in session object
Bits Allocated	0028,0100	US	8	ALWAYS	FIXED	
Bits Stored	0028,0101	US	8	ALWAYS	FIXED	
High Bit	0028,0102	US	7	ALWAYS	FIXED	
Pixel Representation	0028,0103	US	0	ALWAYS	FIXED	
Pixel Data	7FE0,0010	OW/OB		ALWAYS	COPY	copied from source data

Table 34: SC Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Date of Secondary Capture	0018,1012	DA		ALWAYS	AUTO	Not present in session object
Time of Secondary Capture	0018,1014	TM		ALWAYS	AUTO	Not present in session object

Table 35: VOI LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Window Center	0028,1050	DS	128	ALWAYS	AUTO	Only present in session object

Window Width	0028,1051	DS	256	ALWAYS	AUTO	Only present in session object

Table 29: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Creation Date	0008,0012	DA		ANAP	AUTO	
Instance Creation Time	0008,0013	TM		ANAP	AUTO	
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.7	ALWAYS	FIXED	
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	
Instance Number	0020,0013	IS		ANAP	AUTO	

2.1.2.4. Multiframe True Color Secondary Capture Image Storage SOP class

Table 37: IOD of Created Multiframe True Color Secondary Capture Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS (the content of these modules is copied from the source CT study)
Study	General Study Module	ALWAYS (the content of these modules is copied from the source CT study)
	Patient Study Module	ALWAYS (the content of these modules is copied from the source CT study)
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	CONDITIONAL
	SC Equipment Module	ALWAYS
Image	General Image Module	ALWAYS
	Image Pixel Module	ALWAYS
	Cine Module	ALWAYS
	Multi-Frame Module	ALWAYS
	Multi-Frame Functional Groups Module	OPTIONAL
	SC Image Module	ALWAYS
	SC Multi-frame Image Module	ALWAYS
	SOP Common Module	ALWAYS

Table 38: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Referenced Patient Sequence	0008,1120	SQ		ANAP	COPY	
Patient's Name	0010,0010	PN		VNAP	COPY	
Patient ID	0010,0020	LO		VNAP	COPY	
Patient's Birth Date	0010,0030	DA		VNAP	COPY	
Patient's Sex	0010,0040	CS		VNAP	COPY	

Table 39: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		VNAP	COPY	
Study Time	0008,0030	TM		VNAP	COPY	
Accession Number	0008,0050	SH		VNAP	COPY	
Referring Physician's Name	0008,0090	PN		VNAP	COPY	
Study Description	0008,1030	LO		VNAP	COPY	

Procedure Code Sequence	0008,1032	SQ		ANAP	COPY	
> Code Value	0008,0100	SH		ALWAYS	COPY	
> Code Scheme Designator	0008,0102	SH		ALWAYS	COPY	
> Code Meaning	0008,0104	LO		ALWAYS	COPY	
Name of Physicians Reading Study	0008,1060	PN		ANAP	COPY	
Referenced Study Sequence	0008,1110	SQ		ANAP	COPY	
Study Instance UID	0020,000D	UI		ALWAYS	COPY	
Study ID	0020,0010	SH		VNAP	COPY	

Table 40: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Age	0010,1010	AS		ANAP	COPY	
Patient's Size	0010,1020	DS		ANAP	COPY	
Patient's Weight	0010,1030	DA		ANAP	COPY	

Table 301: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ALWAYS	COPY	copied from source data
Series Time	0008,0031	TM		ALWAYS	COPY	copied from source data
Modality	0008,0060	CS	XA	ALWAYS	COPY	copied from source data
Series Description	0008,103E	LO	Snapshot_Movie	ALWAYS	FIXED	
Related Series Sequence	0008,1250	SQ		ANAP	COPY	copied from source data
>Study Instance UID	0020,000D	UI		ANAP	COPY	
>Series Instance UID	0020,000E	UI		ANAP	COPY	
>Purpose of Reference Code Sequence	0040,A170	SQ		EMPTY		
Series Instance UID	0020,000E	UI		ALWAYS	COPY	copied from source data
Series Number	0020,0011	IS		ALWAYS	COPY	copied from source data
Performed Procedure Step Start Date	0040,0244	DA		ANAP	COPY	
Performed Procedure Step Start Time	0040,0245	TM		ANAP	COPY	
Performed Procedure Step ID	0040,0253	SH		ANAP	COPY	
Request Attribute Sequence	0040,0275	SQ		ANAP	COPY	

Table 312: Frame of Reference Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Frame of Reference UID	0020,0052	UI		ALWAYS	COPY	copied from source data
Position Reference Indicator	0020,1040	LO		VNAP	COPY	copied from source data

Table 323: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips	VNAP	COPY	copied from source data
Manufacturer's Model Name	0008,1090	LO	HeartNavigator – TAVI or HeartNavigator - SHD	ANAP	FIXED	Value depends on the HeartNavigator workflow that has created the object.
Device Serial Number	0018,1000	LO		VNAP	CONFIG	
Software Versions	0018,1020	LO	3.1.x	ALWAYS	FIXED	where “x” is the detailed application SW version.

Table 334: SC Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS	XA	ALWAYS	FIXED	
Conversion Type	0008,0064	CS	WSD	ALWAYS	FIXED	

Table 345: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	DERIVED\SECONDARY	ALWAYS	FIXED	
Content Date	0008,0023	DA		ALWAYS	COPY	copied from source data
Content Time	0008,0033	TM		ALWAYS	COPY	copied from source data
Instance Number	0020,0013	IS		ALWAYS	COPY	copied from source data
Patient Orientation	0020,0020	CS		VNAP	COPY	
Burned in Annotation	0028,0301	CS	YES	ALWAYS	COPY	copied from source data
Icon Image Sequence	0088,0200	SQ		ALWAYS	COPY	copied from source data
> Samples per Pixel	0028,0002	US	1	ALWAYS	FIXED	
> Photometric Interpretation	0028,0004	CS	MONOCHROME2	ALWAYS	FIXED	
> Rows	0028,0010	US	128	ALWAYS	FIXED	
> Columns	0028,0011	US	128	ALWAYS	FIXED	
> Bits Allocated	0028,0100	US	8	ALWAYS	FIXED	
> Bits Stored	0028,0101	US	8	ALWAYS	FIXED	
> High Bit	0028,0102	US	7	ALWAYS	FIXED	
> Pixel Representation	0028,0103	US	0	ALWAYS	FIXED	
> Pixel Data	7FE0,0010	OW/OB		ALWAYS	COPY	copied from source data

Table 356: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US	3	ALWAYS	FIXED	

Photometric Interpretation	0028,0004	CS	RGB	ALWAYS	FIXED	
Planar Configuration	0028,0006	US	0	ALWAYS	FIXED	
Rows	0028,0010	US	1024	ALWAYS	FIXED	
Columns	0028,0011	US	1024	ALWAYS	FIXED	
Bits Allocated	0028,0100	US	8	ALWAYS	FIXED	
Bits Stored	0028,0101	US	8	ALWAYS	FIXED	
High Bit	0028,0102	US	7	ALWAYS	FIXED	
Pixel Representation	0028,0103	US	0	ALWAYS	FIXED	
Pixel Data	7FE0,0010	OW/ OB		ALWAYS	COPY	copied from source data

Table 36: Cine Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Cine Rate	0018,0040	IS		ALWAYS	COPY	copied from source data
Frame Time	0018,1063	DS		ALWAYS	COPY	copied from source data

Table 378: Multi-Frame Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Number of Frames	0028,0008	IS		ALWAYS	COPY	copied from source data
Frame Increment Pointer	0028,0009	AT	00181063	ALWAYS	FIXED	

Table 49: Multi-Frame Functional Groups Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Content Date	0008,0023	DA		ALWAYS	COPY	copied from source data
Content Time	0008,0033	TM		ALWAYS	COPY	copied from source data
Instance Number	0020,0013	IS		ALWAYS	COPY	copied from source data
Number of Frames	0028,0008	IS		ALWAYS	COPY	copied from source data

Table 50: SC Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Date of Secondary Capture	0018,1012	DA		ALWAYS	AUTO	
Date of Secondary Capture	0018,1014	TM		ALWAYS	AUTO	

Table 51: SC Multi-Frame Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Frame Increment Pointer	0028,0009	AT	00181063	ALWAYS	COPY	copied from source data
Burned In Annotation	0028,0301	CS	YES	ALWAYS	COPY	copied from source data

Table 52: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Creation Date	0008,0012	DA		ANAP	COPY	copied from source data
Instance Creation Time	0008,0013	TM		ANAP	COPY	copied from source data
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.7.4	ALWAYS	FIXED	
SOP Instance UID	0008,0018	UI		ALWAYS	COPY	copied from source data
Instance Number	0020,0013	IS		ANAP	COPY	copied from source data