

DICOM Correction Proposal

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Correction Number	CP-1335
Log Summary: Clarify SR Frame of Reference for SCOORD3D and TCOORD IODs	
Name of Standard PS 3.3 2013	
Rationale for Correction: <p>The text describing what a series is notes that SRs are not associated with a Frame of Reference, yet the Comprehensive SR IOD includes it. With the introduction of SCOORD3D and IODs using it, Frames of Reference are referenced with each SCOORD3D, though the Comprehensive 3D SR IOD also unnecessarily includes the Frame of Reference Module.</p> <p>Clarify the definition of the series, and remove the Frame of Reference Module from the Comprehensive 3D SR IOD, since SCOORD3D explicitly references the Frame of Reference that it is relative to, and there are no semantics attached to any common Frame of Reference in a Frame of Reference Module, and add the Frame of Reference IOD and the Synchronization Module to any IOD that allows TCOORDS.</p> <p>Note that the original SR IODs in Sup 23 did not contain the Frame of Reference IE, nor the Frame of Reference and Synchronization Modules. These were added in Sup 66 Cath Lab SRs, primarily to support timing information, especially in the procedure logs, and the spatial frame of reference inclusion at that time was unnecessary.</p>	
Correction Wording:	

Amend the series definition

A.1.2.3 SERIES IE

The Series IE defines the Attributes that are used to group composite instances into distinct logical sets. Each series is associated with exactly one Study.

The following criteria group composite instances into a specific series:

- a. All composite instances within a series must be of the same modality
- b. Each series may be associated with exactly one Frame of Reference IE, and if so associated all composite instances within the series shall be spatially or temporally related to each other
- c. All composite instances within the series shall be created by the same equipment; therefore, each series is associated with exactly one Equipment IE
- d. All composite instances within a series shall have the same series information

Presentation States shall be grouped into Series without Images (i.e. in a different Series from the Series containing the Images to which they refer).

Note: The Series containing Grayscale, Color and Pseudo-Color Softcopy Presentation States and the Series containing the Images to which they refer are both contained within the same Study, except for Blended Presentation States, which may refer to images from different Studies.

Waveforms shall be grouped into Series without Images. A Frame of Reference IE may apply to both Waveform Series and Image Series.

SR Documents shall be grouped into Series without Images. The Frame of Reference IE **does not may** apply to SR Document Series, **for SR Documents that contain 3D spatial coordinates relative to one or more spatial Frames of Reference, or temporal coordinates that require a temporal Frame of Reference.**

Add Synchronization Module to Enhanced SR:

A.35.2.3 Enhanced SR IOD Module Table

**Table A.35.2-1
ENHANCED SR IOD MODULES**

IE	Module	Reference	Usage
Patient	Patient	C.7.1.1	M
	Clinical Trial Subject	C.7.1.3	U
Study	General Study	C.7.2.1	M
	Patient Study	C.7.2.2	U
	Clinical Trial Study	C.7.2.3	U
Series	SR Document Series	C.17.1	M
	Clinical Trial Series	C.7.3.2	U
<u>Frame of Reference</u>	<u>Synchronization</u>	<u>C.7.4.2</u>	<u>U</u>
Equipment	General Equipment	C.7.5.1	M
Document	SR Document General	C.17.2	M
	SR Document Content	C.17.3	M
	SOP Common	C.12.1	M

For reference, the Colon CAD SR IOD, which does not contain the Frame of Reference Module:

A.35.10.3 Colon CAD SR IOD Module Table

Table A.35.10-1 specifies the Modules of the Colon CAD SR IOD.

**Table A.35.10-1
COLON CAD SR IOD MODULES**

IE	Module	Reference	Usage
Patient	Patient	C.7.1.1	M
	Clinical Trial Subject	C.7.1.3	U
Study	General Study	C.7.2.1	M
	Patient Study	C.7.2.2	U
	Clinical Trial Study	C.7.2.3	U
Series	SR Document Series	C.17.1	M
	Clinical Trial Series	C.7.3.2	U
Equipment	General Equipment	C.7.5.1	M
	Enhanced General Equipment	C.7.5.2	M

Document	SR Document General	C.17.2	M
	SR Document Content	C.17.3	M
	SOP Common	C.12.1	M

Amend the Comprehensive and Comprehensive 3D SR IODs to remove the Frame of Reference Module, but leave the Information Entity since the Synchronization Module is relevant (and contains information not present in the TCOORD macro).

A.35.3.3 Comprehensive SR IOD Module Table

**Table A.35.3-1
COMPREHENSIVE SR IOD MODULES**

IE	Module	Reference	Usage
Patient	Patient	C.7.1.1	M
	Clinical Trial Subject	C.7.1.3	U
Study	General Study	C.7.2.1	M
	Patient Study	C.7.2.2	U
	Clinical Trial Study	C.7.2.3	U
Series	SR Document Series	C.17.1	M
	Clinical Trial Series	C.7.3.2	U
Frame of Reference	Frame of Reference	C.7.4.1	U
	Synchronization	C.7.4.2	U
Equipment	General Equipment	C.7.5.1	M
Document	SR Document General	C.17.2	M
	SR Document Content	C.17.3	M
	SOP Common	C.12.1	M

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A.35.13.3 Comprehensive 3D SR IOD Module Table

**Table A.35.13-1
COMPREHENSIVE 3D SR IOD MODULES**

IE	Module	Reference	Usage
Patient	Patient	C.7.1.1	M
	Clinical Trial Subject	C.7.1.3	U
Study	General Study	C.7.2.1	M
	Patient Study	C.7.2.2	U
	Clinical Trial Study	C.7.2.3	U
Series	SR Document Series	C.17.1	M
	Clinical Trial Series	C.7.3.2	U
Frame of Reference	Frame of Reference	C.7.4.1	U
	Synchronization	C.7.4.2	U
Equipment	General Equipment	C.7.5.1	M
Document	SR Document General	C.17.2	M
	SR Document Content	C.17.3	M
	SOP Common	C.12.1	M

Add Frame of Reference IE to Chest CAD

A.35.6.3 Chest CAD SR IOD Module Table

Table A.35.6-1 specifies the Modules of the Chest CAD SR IOD.

Table A.35.6-1. Chest CAD SR IOD Modules

IE	Module	Reference	Usage
Patient	Patient	C.7.1.1	M
	Clinical Trial Subject	C.7.1.3	U
Study	General Study	C.7.2.1	M
	Patient Study	C.7.2.2	U
	Clinical Trial Study	C.7.2.3	U
Series	SR Document Series	C.17.1	M
	Clinical Trial Series	C.7.3.2	U
<u>Frame of Reference</u>	<u>Synchronization</u>	<u>C.7.4.2</u>	<u>U</u>
Equipment	General Equipment	C.7.5.1	M
Document	SR Document General	C.17.2	M
	SR Document Content	C.17.3	M
	SOP Common	C.12.1	M

Add TSCoord and correct SCOORD3D

A.35.10.3.1.2 Value Type

Value Type (0040,A040) in Content Sequence (0040,A730) of the SR Document Content Module is constrained to the following Enumerated Values (see Table C.17.3-7 for Value Type definitions):

Enumerated Values:

TEXT
CODE
NUM
DATE
TIME
UIDREF
PNAME
SCOORD
SCOORD3D
TCOORD
COMPOSITE
IMAGE
CONTAINER

A.35.10.3.1.3 Relationship Constraints

The Colon CAD SR IOD makes use of by-reference INFERRED FROM and by-reference HAS ACQ CONTEXT relationships. Other relationships by-reference are forbidden. Table A.35.10-2 specifies the relationship constraints of this IOD. See Table C.17.3-8 for Relationship Type definitions.

Table A.35.10-2. Relationship Content Constraints for Colon CAD SR IOD

Source Value Type	Relationship Type (Enumerated Values)	Target Value Type
CONTAINER	CONTAINS	CODE, NUM, IMAGE ¹ , CONTAINER, UIDREF, DATE, TIME.
TEXT, CODE, NUM, CONTAINER	HAS OBS CONTEXT	TEXT, CODE, NUM, DATE, TIME, PNAME, UIDREF, COMPOSITE ¹ .
IMAGE	HAS ACQ CONTEXT	TEXT, CODE, DATE, TIME, NUM, CONTAINER.
CONTAINER, CODE, COMPOSITE, NUM	HAS CONCEPT MOD	TEXT, CODE ² .
TEXT, CODE, NUM	HAS PROPERTIES	CONTAINER, TEXT, CODE, NUM, DATE, IMAGE ¹ , SCOORD, SCOORD3D, UIDREF.
CODE, NUM	INFERRED FROM	CODE, NUM, IMAGE ¹ , SCOORD, SCOORD3D, CONTAINER, TEXT.
SCOORD	SELECTED FROM	IMAGE ¹ .
TCOORD	SELECTED FROM	SCOORD, SCOORD3D, IMAGE¹, WAVEFORM¹

Correct SCOORD3D

A.35.13.3.1.1 Value Type

Value Type (0040,A040) in Content Sequence (0040,A730) of the SR Document Content Module is constrained to the following Enumerated Values (see Table C.17.3-7 for Value Type definitions):

Enumerated Values:

- TEXT
- CODE
- NUM
- DATETIME
- DATE
- TIME
- UIDREF
- PNAME
- SCOORD
- SCOORD3D**
- TCOORD
- COMPOSITE
- IMAGE
- WAVEFORM
- CONTAINER

Amend the SCOORD3D macro, which contains the reference to the Frame of Reference, to clarify that there is no common or single Frame of Reference for the SR instance

C.18.9 3D Spatial Coordinates Macro

Table C.18.9-1 specifies the Attributes that convey 3D Spatial Coordinates in an SCOORD3D Content Item.

**Table C.18.9-1
3D SPATIAL COORDINATES MACRO ATTRIBUTES**

Attribute Name	Tag	Type	Attribute Description
Referenced Frame of Reference UID	(3006,0024)	1	Uniquely identifies the Frame of Reference within which the coordinates are defined. Note: <u>There is no requirement that the Frame of Reference be the same for all SCOORD3D Content Items in the same SR SOP Instance, nor is there any requirement that the Frame of Reference Module be present.</u>
Graphic Data	(0070,0022)	1	An ordered set of (x,y,z) triplets (in mm and may be negative) that define a region of interest in the patient-relative Reference Coordinate System defined by Referenced Frame of Reference UID (3006,0024). See Section 3.17.1. See C.18.9.1.1 for further explanation.
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