

DICOM Correction Proposal

STATUS	Final Text
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Correction Number	CP-1737
Log Summary:	Remove Note referencing retired Transformation in RT Structure Set
Name of Standard	PS 3.3 2018a
Rationale for Correction:	<p>CP 1249 retired the concept of specifying Registrations and their transformation in an RT Structure Set IOD. The Attribute Description section of the Spatial Reference Module still contains a Note with now-dangling reference to the retired transformation concept of the RT Structure Set. The Note played a transitional role historically when introducing the Registration IODs and is no longer needed. The note is removed.</p>
Correction Wording:	

In PS 3.3, delete the following text in C.20.2 Spatial Registration Module

C.20.2 Spatial Registration Module

Table C.20.2-1 defines the general Attributes of the Spatial Registration Module.

Table C.20.2-1. Spatial Registration Module Attributes

Attribute Name	Tag	Type	Attribute Description
Content Date	(0008,0023)	1	The date the content creation started.
Content Time	(0008,0033)	1	The time the content creation started.
<i>Include Table 10-12 "Content Identification Macro Attributes"</i>			
Registration Sequence	(0070,0308)	1	<p>A sequence of registration items. Each item defines a spatial registration of the images referenced in that item to the Registered RCS established by this SOP instance. All referenced images are in the same spatial frame of reference or atlas.</p> <p>One or more Items shall be included in this Sequence.</p>
>Frame of Reference UID	(0020,0052)	1C	<p>Identifies the Frame of Reference of the referenced data, that may or may not be an image set (e.g., atlas or physical space). See Section C.7.4.1.1.1 for further explanation.</p> <p>Required if Referenced Image Sequence (0008,1140) is absent. May be present otherwise.</p>

Attribute Name	Tag	Type	Attribute Description
>Referenced Image Sequence	(0008,1140)	1C	Identifies the set of images of the referenced data, registered in this Sequence item. One or more Items shall be included in this Sequence. Required if Frame of Reference UID (0020,0052) is absent. May be present otherwise.
>>Include Table 10-3 "Image SOP Instance Reference Macro Attributes"			
>Matrix Registration Sequence	(0070,0309)	1	A sequence that specifies one spatial registration. Only a single Item shall be included in this Sequence.
..			
>>Matrix Sequence	(0070,030A)	1	Specifies one transformation, that registers the Source RCS/images to the Registered RCS. It is expressible as multiple matrices, each in a separate item of the sequence. One or more Items shall be included in this Sequence. The item order is significant and corresponds to matrix multiplication order. See Section C.20.2.1.1.
>>>Frame of Reference Transformation Matrix	(3006,00C6)	1	A 4x4 affine transformation matrix that registers a homogeneous coordinate system A to B. Matrix elements shall be listed in row-major order. See Section C.20.2.1.1.
>>>Frame of Reference Transformation Matrix Type	(0070,030C)	1	Type of Frame of Reference Transformation Matrix (3006,00C6). Enumerated Values: RIGID RIGID_SCALE AFFINE See Section C.20.2.1.2
...			

C.20.2.1 Registration Module Attribute Descriptions

C.20.2.1.1 Frame of Reference Transformation Matrix

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C.20.2.1.2 Frame of Reference Transformation Matrix Type

There are three types of Registration Matrices:

RIGID: This is a registration involving only translations and rotations. Mathematically, the matrix is constrained to be orthonormal and describes six degrees of freedom: three translations, and three rotations.

RIGID_SCALE: This is a registration involving only translations, rotations and scaling. Mathematically, the matrix is constrained to be orthogonal and describes nine degrees of freedom: three translations, three rotations and three scales. This type of transformation is sometimes used in atlas mapping.

AFFINE: This is a registration involving translations, rotations, scaling and shearing. Mathematically, there are no constraints on the elements of the Frame of Reference Transformation Matrix other than that the last row shall be

(0,0,0,1) to preserve the homogeneous coordinates, so it conveys twelve degrees of freedom. This type of transformation is sometimes used in atlas mapping.

Note

~~The AFFINE value for Frame of Reference Transformation Matrix Type (0070,030C) has the same meaning as the use of the HOMOGENEOUS value for Frame of Reference Transformation Type (3006,00C4) in the Structure Set Module. See Section C.8.8.5.~~

See Annex P “Transforms and Mappings (Informative)” in PS3.17 for more detail.