

DICOM Correction Item

Correction Number CP-555	
Log Summary: RT Image Position Clarification	
Type of Modification Clarification	Name of Standard PS 3 2004
<p>Rationale for Correction:</p> <p>The RT Image Position (3002, 0012) describes the position of the 'upper left hand corner (first pixel transmitted)'. The RT Image Orientation (3002,0010) describes the orientation of the rows/columns in respect to the IEC Receptor System. If both tags are provided, the position of the image in the IEC system is completely defined.</p> <p>However, the RT Image Orientation (3002,0010) is only required, when the RT Image Plane (3002, 000C) is NON_NORMAL. For the NORMAL cases the RT Image Orientation may not be provided. In this case, the interpretation of the position of the upper left corner is not obvious. It is important to be aware, that RT Images are always viewed from the radiation sources (in IEC coordinate system, this is the direction opposite to the IEC Zr direction) to interpret the orientation of rows and columns correctly (along the DICOM definition to use the right hand system for x, y, z). Further on (when the orientation is not provided), the rows and columns go along the positive IEC Xr and the negative IEC Yr axis respectively. This CP clarifies the definition.</p> <p>The same issue applies to the compensator definition.</p>	
<p>Sections of documents affected</p> <p>PS 3.3 C 8.8.14 (RT Beams Module)</p> <p>PS 3.6 Section 6</p>	
Correction Wording:	

In PS 3.3, Section C.8.8.2 (RT Image Module), add to the description of RT Image Orientation and RT Image Position (3002,0012):

Attribute Name	Tag	Type	Attribute Description
RT Image Orientation	(3002,0010)	2C	The direction cosines of the first row and the first column with respect to the IEC X-RAY IMAGE RECEPTOR coordinate system. Required if RT Image Plane (3002,000C) is NON_NORMAL. <u>May be present otherwise.</u>
...			
RT Image Position	(3002,0012)	2	The x and y coordinates (in mm) of the upper left hand corner (first pixel transmitted) of the image, in the IEC XRAY IMAGE RECEPTOR coordinate system. <u>See C.8.8.2.x.</u>

In PS 3.3, Section C.8.8.2 (RT Image Module), add the following text as section, below table 8-34:

C.8.8.2.x

When RT Image Plane (3002,000C) is NORMAL and RT Image Orientation (3002,0010) is not provided, the orientation is defined as follows: The image viewing direction goes from the radiation source to the image (i.e. in the sense of a beam's eye view, or along the negative Zr direction of the IEC X-RAY IMAGE RECEPTOR coordinate system). The direction of rows goes along the positive Xr direction and the direction

of the columns goes along the negative Yr direction of the IEC X-RAY IMAGE RECEPTOR coordinate system. Other interpretations shall be documented in an implementation's conformance statement.

In PS 3.3, Section C.8.8.14 (RT Beams Module), add to the description of RT Image Position (3002,0012):

Attribute Name	Tag	Type	Attribute Description
>>Compensator Transmission Data	(300A,00EB)	1C	A data stream of the pixel samples which comprise the compensator, expressed as thicknesses (in mm). The order of pixels sent is left to right, top to bottom, i.e., the upper left pixel is sent first followed by the remainder of the first row , followed by the first pixel of the 2nd row, then the remainder of the 2nd row and so on) when viewed from the radiation source. Required if Compensator Sequence (300A,00E3) is sent and Material ID (300A,00E1) is non-zero length. See C.8.8.14.9 <u>and C.8.8.14.x.</u>
>>Compensator Thickness Data	(300A,00EC)	1C	A data stream of the pixel samples which comprise the distance from the radiation source to the compensator surface closest to the radiation source (in mm). The order of pixels sent is left to right, top to bottom (upper left pixel, followed by the remainder of row 1, followed by the remainder of the columns). Required if Compensator Sequence (300A,00E3) is sent, Material ID (300A,00E1) is non-zero length, and Compensator Mounting Position (300A,02E1) is DOUBLE_SIDED. See C.8.8.14.9 <u>and C.8.8.14.x.</u>

In PS 3.3, Section C.8.8.14 (RT Beams Module), add the following text as new section, below table 8-46:

C.8.8.14.x

The direction of the rows and columns in Compensator Transmission Data (300A, 00EB) and Compensator Thickness Data (300A,00EC) is defined as follows: The direction of rows goes along the positive Xb direction and the direction of the columns does along the negative Yb direction of the IEC X-BEAM LIMITING DEVICE coordinate system. Other interpretations shall be documented in an implementation's conformance statement.