

DICOM Correction Item

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| Correction Number CP-616 | |
| Log Summary: Gantry Pitch Angle in RT | |
| Type of Modification Addition | Name of Standard PS 3 2006 |
| <p>Rationale for Correction:</p> <p>Today, new patient position verification devices are in use in which imaging is done in the treatment room using imaging sources attached to the gantry or the treatment room walls. The radiation sources of these imaging sources are not necessarily located on the plane spanned by the IEC Xg and IEC Zg axis (or the plane going through the gantry focus and the isocenter). It is not possible to describe such focal points off the Z/X plane in the current standard. Another example of a device needing off-plane source definitions is a linear accelerator mounted on a robotic arm.</p> <p>Therefore, an additional angle is needed to describe a radiation source located at any point in the 3D space around the isocenter. This new angle moves the source out of the IEC Xg/Zg plane into 3D space. Together with the gantry angle (as the angle of the radiation source along the existing IEC definition of the gantry system) and the SAD (or possibly SID in case of RT Images), any point can be described. The additional angle rotates on an axis perpendicular to IEC Yg (which is the gantry system rotation axis) and IEC Zg (where the source is located).</p> <p>In respect to the IEC system, this rotation represents an additional pitch rotation of the GANTRY system. The Beam Limiting Device System and the X-ray Image Receptor System remain daughter systems of the GANTRY system. Therefore the relation of all geometrical parameters in RT beams and RT images remains the same with respect to the radiation source – just the source location is out of the Xg/Zg plane.</p> <p>As an example, for RT images the X-Ray Image Receptor Translation still represents the translation of the receptor system in the parent system (the GANTRY system, with the additional Gantry Pitch angle), RT Image Plane NORMAL still means that the radiation source is the normal axis of the image, and the RT Image Orientation still refers to the orientation of rows and columns in the (rotated) IEC X-Ray Image Receptor system.</p> | |
| <p>Sections of documents affected</p> <p>PS 3.3 C 8.8.2 (RT Image Module)</p> <p>PS 3.3 C 8.8.14 (RT Beams Module)</p> <p>PS 3.3 C 8.8.21 (RT Beams Session Record Module)</p> <p>PS 3.3 C 8.8.11 (RT Tolerance Table Module)</p> <p>PS 3.6 Section 6</p> | |
| Correction Wording: | |

In PS 3.3, Section C.8.8.2 (RT Image Module), Table C.8-38, add the following attribute after Gantry Angle (300A,011E):

| Attribute Name | Tag | Type | Attribute Description |
|---------------------------|--------------------|----------|---|
| Gantry Pitch Angle | (300A,014A) | 3 | Gantry Pitch Angle. i.e. the rotation of the IEC GANTRY coordinate system about the X-axis of the IEC GANTRY coordinate system (degrees). See C.8.8.14.11. |

In PS 3.3, Section C.8.8.14 (RT Beams Module), Table C.8-50, add the following attribute after Gantry Rotation Direction (300A,011F):

| Attribute Name | Tag | Type | Attribute Description |
|-----------------------------------|-------------|------|---|
| Beam Sequence | (300A,00B0) | 1 | Introduces sequence of treatment beams for current RT Plan. One or more items may be included in this sequence. |
| ... | | | |
| >Control Point Sequence | (300A,0111) | 1 | Introduces sequence of machine configurations describing treatment beam. Two or more items may be included in this sequence. See C.8.8.14.5 and C.8.8.14.6. |
| ... | | | |
| >>Gantry Pitch Angle | (300A,014A) | 3 | Gantry Pitch Angle. i.e. the rotation of the IEC GANTRY coordinate system about the X-axis of the IEC GANTRY coordinate system (degrees). If used, must be present for first item of Control Point Sequence, or if used and Gantry Pitch Rotation Angle changes during Beam, must be present. See C. 8.8.25.6.5. |
| >>Gantry Pitch Rotation Direction | (300A,014C) | 3 | Direction of Gantry Pitch Angle when viewing along the positive X-axis of the IEC GANTRY coordinate system, for segment following Control Point. If used, must be present for first item of Control Point Sequence, or if used and Gantry Pitch Rotation Direction changes during Beam, must be present. See C.8.8.14.8 and C. 8.8.25.6.5. Enumerated Values: CW = clockwise CC = counter-clockwise NONE = no rotation |

In PS 3.3, Section C.8.8.21 (RT Beams Session Record Module), Table C.8-57, add the following attribute after Gantry Angle (300A,011E):

| Attribute Name | Tag | Type | Attribute Description |
|----------------------------------|-------------|------|--|
| Treatment Session Beam Sequence | (3008,0020) | 1 | Introduces sequence of Beams administered during treatment session. The sequence may contain one or more items. |
| ... | | | |
| >Control Point Delivery Sequence | (3008,0040) | 1 | Introduces sequence of beam control points for current treatment beam. The sequence may contain one or more items. See C.8.8.21.1. |
| ... | | | |

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|-----------------------------------|-------------|---|--|
| >>Gantry Pitch Angle | (300A,014A) | 3 | Gantry Pitch Angle. i.e. the rotation of the IEC GANTRY coordinate system about the X-axis of the IEC GANTRY coordinate system (degrees). If used, must be present for first item of Control Point Sequence, or if used and Gantry Pitch Rotation Angle changes during Beam, must be present. See C. 8.8.25.6.5. |
| >>Gantry Pitch Rotation Direction | (300A,014C) | 3 | Direction of Gantry Pitch Angle when viewing along the positive X-axis of the IEC GANTRY coordinate system, for segment following Control Point. If used, must be present for first item of Control Point Sequence, or if used and Gantry Pitch Rotation Direction changes during Beam, must be present. See C.8.8.14.8 and C. 8.8.25.6.5. Enumerated Values: CW = clockwise CC = counter-clockwise NONE = no rotation |

In PS 3.3, Section C.8.8.11 (RT Tolerance Table Module), Table C.8-47, add the following attribute after Gantry Angle Tolerance (300A,0044):

| Attribute Name | Tag | Type | Attribute Description |
|-------------------------------|--------------|------|--|
| Tolerance Table Sequence | (300A,0040) | 3 | Introduces sequence of tolerance tables to be used for delivery of treatment plan. One or more items may be included in this sequence. See Note 1. |
| ... | | | |
| >Gantry Pitch Angle Tolerance | (300A, 014E) | 3 | Maximum permitted difference (in degrees) between planned and delivered Gantry Pitch Angle. |

In PS 3.6, Section 6, add the following new attributes:

| Tag | Name | VR | VM |
|-------------|------------------------------|----|----|
| (300A,014E) | Gantry Pitch Angle Tolerance | FL | 1 |