

RT Structure Sets

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Assumptions

- All Contours will be defined in the frame of reference of a primary image set
- All Contours will be defined on a (transverse) primary image slice
 - Z will be the same for images and the corresponding contours
 - The ATC Conformance Statement had NOT been explicit on this point.

Contour and Image Axial Positions

- In order to perform QA on segmentation, images and contours must coincide.
- Some planning systems resample images prior to segmentation. We need the images used for segmentation.
 - Review what was seen by the planner

RT STRUCTURE SET IOD MODULES

IE	MODULE	Usage
Patient	Patient	M
	Clinical Trial Subject	U
Study	General Study	M
	Patient Study	U
Series	RT Series	M
Equipment	General Equipment	M
Structure Set	Structure Set	M
	ROI Contours	M
	ROI Observations	M
	Approval	U
	Audio	U
	SOP Common	M

Structure Set Module

Field	Tag	Type	Comments
Structure Set Label	(3006,0002)	1	
Structure Set Date	(3006,0008)	2	
Structure Set Time	(3006,0009)	2	

Structure Set Module

Field	Tag	Type	Comments
Referenced Frame of Reference Sequence	(3006,0010)	3	Required to connect Structure Set to image series. This sequence shall contain exactly one item.
>Frame of Reference UID	(0020,0052)	1C	Only expect a single UID
Structure Set ROI Sequence	(3006,0020)	3	Required to provide structure set data
>ROI Number	(3006,0022)	1C	
>Referenced Frame of Reference UID	(3006,0024)	1C	Should be the same as sole Frame of Reference UID (0020,0052) above
>ROI Name	(3006,0026)	2C	Required to identify ROI's as named by user. Must be nonNULL
>ROI Generation Algorithm	(3006,0036)	2C	

Frame of Reference

Ref'd Frame of Reference Sequence

→ • Frame of Reference UID

ROI Sequence

→ • Ref'd Frame of Reference UID

ROI Contour Module

Field	Tag	Type	Comments
ROI Contour Sequence	(3006,0039)	1	
>Referenced ROI Number	(3006,0084)	1	
>Contour Sequence	(3006,0040)	3	Required to introduce a Sequence of Contours for a given ROI
>>Contour Geometric Type	(3006,0042)	1C	Must be CLOSED_PLANAR for contours. ITC accepts POINT to extract some point of interest.
>>Number of Contour Points	(3006,0046)	1C	
>>Contour Data	(3006,0050)	1C	Sequence of (x,y,z) triplets defining a contour in the patient coordinates

ROI Contour Module (cont.)

- Contour Geometric Type (3006,0042) choices: POINT, OPEN_PLANAR, OPEN_NONPLANAR, and CLOSED PLANAR.
- We currently only support CLOSED_PLANAR and POINT.
 - For Contours the first point is not repeated (i.e. closing is implied)
 - ITC accepts POINT to extract some point of interest, e.g., isocenter, dose specification point. POINT does not have to lie in an image plane.
- We expect z to be constant and the same as the z of an image for Contours.
 - Our precision for z is 0.1mm. If there are floating point discrepancies, the contour will go to the nearest image.

ROI Observation Module

Field	Tag	Type	Comments
RT ROI Observations Sequence	(3006,0080)	1	
>Observation Number	(3006,0082)	1	
>Referenced ROI Number	(3006,0084)	1	
>ROI Observation Label	(3006,0085)	3	If ROI Name (3006,0026) is NULL and this attribute is provided ITC will use it as the structure name
>RT ROI Interpreted Type	(3006,00A4)	2	Will be used by ITC to classify ROI, if provided.
>ROI Interpreter	(3006,00A6)	2	

ROI Observation Module

ROI Interpreted Type

- Type of ROI. Defined Terms:
EXTERNAL, PTV, CTV, GTV,
TREATED_VOLUME, IRRAD_VOLUME,
BOLUS, AVOIDANCE, **ORGAN**, MARKER,
REGISTRATION ROI ISOCENTER,
CONTRAST_AGENT, CAVITY,
BRACHY_CHANNEL, BRACHY_ACCESSORY,
BRACHY_SRC_APP, and BRACHY_CHNL_SHLD

Original CT data set with irregular spacing

Resampled CT data set

Structures Segmented on Resampled CT Data Set, but are sent with Original CT Data Set

Larger CT spacing away From anatomy of interest

Finer CT spacing near anatomy of interest (target volume)