



Secretariat: MITA/NEMA  
1300 North 17th Street, Suite 900  
Arlington, VA 22209, USA

<http://www.dicomstandard.org>  
[dicom@dicomstandard.org](mailto:dicom@dicomstandard.org)

# Meeting Minutes

## DICOM WORKING GROUP SEVEN (RADIOTHERAPY)

<b>Meeting Location</b>	Online Meeting	
<b>Dates and Times</b>	Monday, June 7, 2021	9:00 – 13:00 EDT
	Tuesday, June 8, 2021	9:00 – 13:00 EDT
	Monday, June 14, 2021	9:00 – 13:00 EDT
	Tuesday, June 15, 2021	9:00 – 13:00 EDT
<b>Presiding Officers</b>	Christof Schadt, Co-Chair	
	Jim Percy, Co-Chair	
<b>Secretary</b>	Shayna Knazik, MITA	
<b>Dial-in Information</b>	<a href="#"><u>Join Microsoft Teams Meeting</u></a>	
	Meeting ID 702 844 473#	

# Participants

<b>Affiliation</b>	<b>Name</b>	<b>Mon Jun 7</b>	<b>Tue Jun 8</b>	<b>Mon Jun 14</b>	<b>Tue Jun 15</b>
AAPM	Walter Bosch	X	X	X	X
AAPM	Bruce Curran				X
AAPM	Yulong Yan	X	X	X	X
Accuray	Jim Beck				X
Accuray	Bob Pekarek	X	X		
ADAM	Ondrej Sevela	X			
Brainlab	Christof Schadt			X	X
Elekta	Jim Percy	X	X	X	X
IBA	David Wikler	X	X	X	X
Leeds Teaching	Steve Weston				X
Mevion	Bruce Rakes	X	X	X	X
MITA/NEMA	Shayna Knazik	X	X	X	X
Philips	Tulasi Anand	X			
RaySearch	Marcus Bergman	X	X	X	
RaySearch	Stefan Pall Boman			X	X
RaySearch	Jon Treffert	X	X	X	
Self	Ulrich Busch	X	X	X	X
Sun Nuclear	Chris Pauer				
Varian	Kari Jyrkkälä	X	X		X

## Actual Week Schedule

	Monday	Tuesday	Monday	Tuesday
Session 1 09:00-09:55	Setup, Administrative, Opening General Discussions	Sup 213 Public Comments (cont)	Sup 213 Public Comments (cont)	Sup 160 prep for WG-06
Session 2 10:00-10:50	Sup 213 Public Comments	Sup 213 Public Comments (cont)	CPs	up 160 prep for WG-06
Session 3 11:10-12:00	Sup 213 Public Comments (cont)	Sup 213 Public Comments (cont)	Sup 213 Public Comments (cont)	CPs
Session 4 12:05-13:00	Sup 213 Public Comments (cont)	Sup 213 Public Comments (cont)	Sup 213 Public Comments (cont)	CPs

For details on the topics, see the sections below.

## Minutes

### **Administrative**

- Introductions, identify participants.
- Remind anti-trust rules and DICOM Patent Disclosure Policy
- Review the agenda and revise as needed.
- Review meeting minutes from the last meeting(s).

### **Subgroups and related Group Status**

Update reports will be only presented as needed:

- Brachytherapy Subgroup
  - TPPC-Brachy Profile is nearly ready to release for public comment.
- Ion Subgroup
  - Group has been working to cleanup of 1st gen objects with 2<sup>nd</sup> gen concepts.
  - Feedback on proposed new Ion priorities is due June 15<sup>th</sup>.
  - Bruce Rakes is leading effort to develop TDRC-Ion.
- Motion Management Subgroup
- IHE-RO
  - AAPM VPN User Agreement – response needed
  - DRRO Profile progress
  - Uniform Support for Offline and Online Review and Annotation
  - XRTS Activity in FHIR Domain
  - Point cloud
- IEC
- WG-28 – meeting Jun 9-11, 2021
  - Working on new Supp to update Radiation Dose Reporting Use Cases
- Other Subgroup reports as needed.

### **Organizational**

Next meeting

Shayna to create doodle poll

- August
- October

### **General Discussions**

## CPs

See also: [WG-07 CP Status List](#)

### CPs new to WG-07

#### CPs in Work

##### **cp RT175 Retire Beam Dose Depth Parameters**

Feedback from QA vendors?

- At least one vendor uses these attributes in an old version of their old software.
- Topic was tabled pending clarification from other QA vendors.

##### **cp RT176 Add Baseline CIDs To RT Structure Set**

Christof to evaluate whether there is work necessary regarding the CIDs (see open item in Rationale).

- Several additional codes are needed to provide a definition for defined terms in ROI Interpreted Type
  - o REGISTRATION (generic) - used for point-based spatial registration; more specific concepts are available as Fiducials. A more generic code is needed in this context.
  - o CONTRAST\_AGENT (generic) - propose SNOMED code (SCT, 385420005, Contrast Media)
  - o CAVITY
- CP to be presented to WG-06 next week.

##### **cp RT177 Add Plan Overview Parameters to RT Dose**

Provides linkage to RT Structure Set and basic RT Plan information

- Uses Dose Summation Type (UNREF\_PLAN) to indicate that the dose is from an unreferenced plan.
- The Plan Overview Sequence (1C, required Dose Summation Type is UNREF\_PLAN) includes
  - o RT Plan Label
  - o Number of Fractions Included
  - o Treatment Site
  - o Treatment Site Code
  - o Treatment Site Code Modifier
  - o Prescription Overview Sequence
    - Total Prescription Dose
    - Referenced ROI Number
  - o Referenced Structure Set (req'd if no referenced Image)
  - o Referenced Image Sequence (req'd if no referenced Structure Set)
- Create Treatment Site Macro (Treatment Site, Treatment Site Code, Treatment Site Modifier)
- Christof to revise CP and present to WG-06 next week.

##### **cp RT182 Add Anatomic Region to RT Plan**

Discussion started at last meeting whether to introduce codes for the Treatment Site definition and retire the existing multi-valued LO attribute.

- Include Treatment Site Code Sequence
- WG-07 voted to retire existing multi-value attribute. (Majority voted yes, one opposed.)

### **cp RT183 (Ion Group)**

Proposal to correct the unit for fixation light polar angle tolerance.

- The prescription for polar angle is expressed in degrees, but the tolerance is in millimeters.
- Corrected text:
  - o Maximum permitted difference (~~in mm~~) **(in degrees)** between planned and delivered Fixation Light Polar Angle (300A,0358).
- CP to be presented to WG-06 next week.

### **cp RT166 Differentiate Geometric Types of CT Imaging Sources**

Create a definition for a CBCT and provide to IEC for 60601-2-68?

Then refer to it from CP RT166 and thus limit the scope of applicability to RT in order to avoid conflicts with other use of CBCT (and thus potentially different definitions)?

- Topic was tabled
- To be discussed at the next WG-07 meeting

### **New Interlock Codes**

Kari proposed the addition of seven new codes to CID 9568.

- Draft CP to be presented to WG-06 next week.

### **Multi-Layer MLC**

Some recently released treatment devices have multi-layer beam limiting devices (MLCs)

Proposal to identify multi-layered MLCs using new Enumerated values

- Concern expressed that correct identification is highly safety-critical and that it is essential to avoid confusion by existing applications.
- Alternative approaches were discussed briefly
- Further discussion at the next meeting.

## Sup 213 Public Comment Feedback

The group reviewed and responded to concerns raised during the Public Comment period. Details captured in document sup213\_DLB1\_EnhancedRTImage.docx.

- Pixel Measures is a shared functional group.
- RT Image Frame Radiation Acquisition Parameters
- RT Beam Limiting Device Opening Macro (consistency with number of BLDs)
- Real World Mapping (Usage changed to U)
- Imaging Source Coordinate System
  - o Some examples would be helpful. E.g., isocenter is at Z= -1000mm.
  - o Combine “Imaging Source and Receptor” parameters as generic “Device parameters”?
- Start Cumulative Meterset
  - o Attribute Type: change from 1C to 2 and remove condition
- RT Image Fram kV Radiation Acquisition Sequence
  - o Photon (kV, MV) vs particle (MeV)
- An Enhanced RT Image may reference *either* a Radiation *or* a Radiation Set

**ACTION:** WG-07 to discuss further whether to make the reference to Radiation Set optional in Sup 160 C.36.2.2.X.3 (RT Radiation Instance and Position Group Reference). This macro is used in Sup 213.

**ACTION:** Uli Busch and Jon Treffert to gather input from Ion vendors about whether the current beam generation macro is sufficient for ion imaging.

Resume discussion of Sup 213 Enhanced RT Image [6/8 at 9:15am ET]

- Respiratory synchronization was retained
- Image Type (0008,0008) at top level and Frame Type (0008,9007) at the frame level.
- Use consistent names of Start and Stop (rather than “End”) Cumulative Meterset attributes
- Discussion of what should be recorded for the Enhanced RT Image
  - o RT Patient Support Device
  - o RT Beam Limiting Device (for therapeutic beams)
  - o RT Accessory Holders?
  - o General Accessories?
  - o Patient Position Acquisition Device
  - o RT Treatment Position
- Exposure Time in uS: This is needed for dose reporting for ionizing radiation (changed to Type 2)
- Annotation of devices used to create RT Images: ID SUP213033 “RT Image Patient Position Acquisition Devices”. Devices include the following:
  - o Digital Imager (RT)
  - o X-ray film cassette

- Radiotherapy Treatment Planning System
- Patient Positioning System
- Comments from Thomas Schwere were reviewed by the group.
  - References beam limiting Device Index
  - Discussion of Scan Rotation for Cone Beam Acquisitions:
    - Specify rotation using start and stop angles encoded as continuous angles
    - For IEC coordinates, 0, 360, ... = 0 degrees.
    - The algebraic difference between start and stop angles encodes magnitude and direction.
    - Uli to develop examples.
  - Maximum Cumulative Meterset Exposure
  - Delivery Rate (nominal Meterset delivery rate) for image acquisitions that are not simultaneous with therapeutic beam delivery (Type 2C)
  - RT Treatment Position Macro discussion – establishes connection between patient geometry and treatment delivery equipment
    - RT Treatment Position is also used to describe the relationship of patient to imaging equipment
    - RT Treatment Position Macro to be moved inside a Type 3 Sequence to make it optional.
  - RT Patient Position Acquisition Instruction
    - Scoping: is the instruction for a Radiation or for an entire Radiation Set?
    - Keep note regarding urgent (and other) treatment scenarios
  - RT Treatment Setup Position – distinct from Treatment Position
  - RT Projection Imaging Request Geometry Macro
    - More than one (gantry) angle based acquisition trigger is possible. It is possible to create contradictory instructions, but specifying conditions to avoid conflict was judged to be too complex to be worthwhile.

#### For further work

- Treatment Position – make optional
- Revisit C.36.2I2.X4-1 RT Treatment Setup Position Macro
- Determine what is the minimum dataset for the Acquisition Instruction IOD

#### Discussion of Michael Moyers' comment regarding treatment, QA, and localization beam types.

- These are handled in 2nd Gen by (imaging) instruction IODs.

As of the start of the meeting on 6/14, WG-07 had finished reviewing comments from Thomas Schwere. Two CPs resulting from this review are to be drafted. One CP adds examples for use of continuous angles. The other includes text to generalize the use of the RT Treatment Position Macro.

Patient position for imaging can be described by two methods: (a) using a Treatment Position (absolute position), or (b) via a displacement in the RT Treatment Setup Position Macro (relative position).

- These two methods are mutually exclusive: only one may be used at a time.



- Edit RT Treatment Setup Position Macro in **sup160\_DLB2\_PatientSetup.docx**
  - o Change “Treatment Position Sequence” to “Treatment Setup Position Sequence” - TODO: update Data Dictionary
  - o Change “Treatment Position Displacement Sequence” to “Treatment Setup Position Displacement Sequence” - TODO: update Data Dictionary
  - o Both sequences were changed to Type 2C; each is required if the other is absent. Zero or one item shall be included in each sequence.

Removed RT Treatment Position Macro invocation in RT Patient Position Acquisition Macro in Sup213.

RT Radiation Instance and Treatment Position Group Reference Macro – declares scope (applicability) of a set of positioning parameters. Name was changed to RT Patient Position Scope Macro.

- Discussion whether this macro need to reference RT Radiation Set. Decision to allow a sequence of referenced Radiations. (This applies equally to both Sup 160 and Sup 213).
- RT Patient Position Scope is defined for either
  - o Referenced RT Radiation Sequence (individual Radiations), or
  - o Referenced RT Radiation Set Sequence
    - Referenced RT Radiation Sequence (defines subset of Radiation Set)
    - Treatment Position Group Sequence (if defined in Radiation Set(s))
- Review of contexts in which the RT Patient Position Scope Macro is invoked.
- RT Patient Treatment Preparation Module
  - o Patient Setup Displace Parameters: Reference by index or include value?

Christof to cleanup document for further review 6/15.

## Sup 160 Preparation for Reading for Letter Ballot with WG-06

The group reviewed remaining issues in document sup160\_DLB2\_PatientSetup.docx.

RT Patient Treatment Preparation Module

- Discussion of the linkage between Radiation (Sets) and Patient Treatment Preparation Instances
- Should an RT Patient Treatment Preparation Instance represent one or more than one setup (target)? Yes: consensus that a RT Patient Treatment Preparation Instance represents a *single* setup.

Patient Orientation

- The existing Patient Orientation Macro (Part 3, section 10.12) is nearly the same as what is needed. However, the Patient Gantry Relationship Code Sequence is Type 3. This is a *required attribute for the Treatment Position Macro*.

Use Instance Reference Macro to reference patient setup photos.

Christof to update the document and PowerPoint presentation for reading with WG-06 next week on June 21 and 23.

## 1<sup>st</sup> Gen/ 2<sup>nd</sup> Gen Hybrid Discussions

Based on the decision to evaluate a hybrid approach for 1<sup>st</sup> Generation RT Objects to include 2<sup>nd</sup> Gen IODs where possible and merge in 2<sup>nd</sup> Gen concepts where feasible, the following topics are to be discussed in more detail.

The current overview can be found in [this list](#).

An E-R diagram of an hybrid approach can be found [here](#).

### Hybrid RT Plan

This discussion may be based on different proposals:

- [Enhanced RT Plan](#) (Uli)
- [RT Physician Intent Reference from RT Plan](#), CP RT152; [Enhanced Prescription](#) (Kari)
- [Constituent Mapping for RT Plan](#), CP RT155 (Christof)
- [Dual Layer MLC support](#) (Kari)
- [Add Offset to MLC Positions](#) (Bruce R.), [White Paper Add Offsets to MLC Positions](#)

### Hybrid RT Dose

This discussion may be based on the proposal to continue on Supplement 177 but utilizing the RT Dose instead of the RT Dose Map Annotation/Parametric Map approach:

- [Sup177 RTDose\\_DoseObjects.docx](#)

### RT Structure Set

For the RT Structure Set there are mainly two aspects: extending the ROI definition with the CV UID (which is covered by the Enhanced Prescription approach above) and cleaning up the overloaded RT ROI Interpreted Type, as proposed by [a potential CP](#).

## **Future Meeting Dates, Agenda for the Next Meeting and other Administrative Topics**

### **Schedule**

The list should be reviewed again, whether any adaptations are required since the last meeting.

[Teams Meeting List](#)

## **Appendix: General Information**

### **I. Project List**

The list of major projects pursued by WG-07 can be found [here](#).

### **II. Presentation Material for 2nd Generation RT Objects**

A folder is maintained containing material of presentations on 2<sup>nd</sup> Generation topics.

Everyone is invited to use any material out of that folder for presentations.

In turn everyone should to add his presentations to this folder, if they could be of general use. As needed, take care to remove any company- or institution-confidential parts before posting.

<ftp://medical.nema.org/MEDICAL/Private/Dicom/WORKGRPS/Wg07/2ndGeneration/Presentations>

Submitted by Shayna Knazik

Reviewed by Counsel 8/2/21