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# Meeting Minutes

## DICOM WORKING GROUP SEVEN (RADIOTHERAPY)

<b>Meeting Location</b>	Online Meeting	
<b>Dates and Times</b>	Nov 30-Dec 1, 7-8, 2020	
	Monday, Tuesday, Monday, Tuesday	9:00 – 13:00 EDT
<b>Presiding Officers</b>	Christof Schadt, Co-Chair Jim Percy, Co-Chair	
<b>Secretary</b>	Shayna Knazik, MITA	

# Participants

Name	Affiliation	Mon 11/30	Tue 12/1	Mon 12/7	Tue 12/8
Jim Percy	Elekta	X	X	X	X
Walter Bosch	AAPM	X	X	X	X
Yulong Yan	AAPM	X	X		
Bruce Curran	AAPM	X	X	X	X
Bruce Rakes	Mevion	X	X		
Bob Pekarek	Accuray		X	X	X
Kari Jyrkkälä	Varian	X	X	X	X
Ulrich Busch	Varian	X	X	X	X
David Wikler	IBA	X	X	X	X
Christof Schadt	Brainlab	X	X	X	X
Stefan Pall Boman	RaySearch	X	X	X	
Marcus Bergman	RaySearch	X	X	X	
Jon Treffert	RaySearch	X	X	X	X
Andreas Lindstrom	RaySearch	X	X	X	
Shayna Knazik	NEMA	X	X	X	X
Elias Lundeqvist	RaySearch		X		X
Hansen Chen	Philips			X	X

# Actual Week Schedule

	<b>Monday 11/30</b>	<b>Tuesday 12/1</b>	<b>Monday 12/7</b>	<b>Tuesday 12/8</b>
<b>Session 1 09:00-09:55</b>	Setup, Administrative, Opening Group Status	Supp 215 Ion	Supp 178 RT Course	CPs
<b>Session 2 10:00-10:50</b>	General Discussion	Supp 215 Ion	Supp 178 RT Course	CPs
<b>Session 3 11:10-12:00</b>	New CP	Supp 213 RT Image	Supp 160 Setup	Supp 160 (3 topics), Supp 196 Segmentation Template, Supp 177
<b>Session 4 12:05-13:00</b>	New CP	Supp 213 RT Image	Supp 160 Setup	WG-07 Teams, Procedures, Future Meetings 2021

# Topics

## Administrative

- The meeting was called to order on Monday, November 30, 2020 at 09:05am ET.
- Shayna Knazik reminded the group of NEMA anti-trust rules and patent disclosure policy.
- Attendees introduced themselves.
- The meeting agenda was reviewed and revised.
- Both the October and September 2020 WG-07 meeting minutes were reviewed and approved without objection or abstention.

## Subgroup Status

- Brachytherapy – work in progress
- Ion – proposal to be discussed with Supp 215
- Motion management (dormant at present)
- IHE-RO – Jon Treffert and Walter Bosch reported on IHE-RO pre-testing in November and preparation for the March 2021 Connectathon
- AdvaMed RT-03 – no update
- IEC 61217
  - Jim, Kari and Christof talked to Geoff Ibbott about Rev. 3
  - The concerns were discussed and Geoff will rework the current draft.
- WG-28 – work on Structured Reporting for dose (Supp 214)
  - The next WG-28 meeting is December 16th from 9-11am US ET.
- Development priority for Supp 178 RT Course. The scope is large – discussion of how to fast-track this Supplement.

## Organizational

- Teams appears to be working effectively for the core group.
- Working copies of CPs and Supplements are shared in Teams.
- Versions for reading with WG-06 and final versions are stored on the the FTP server.
- OneDrive sync allows documents to be stored locally and edited concurrently by multiple users.
- **ACTION:** WG-07 core group to review Christof's procedures document and be ready for discussion at next meeting in February:
  - [https://nemaorg137.sharepoint.com/:w:/r/sites/DICOMWG-07Radiotherapy/Shared%20Documents/General/WG-07\\_Document\\_Procedures.docx?d=w801cc72747b34ee1aa736746d59b0570&csf=1&web=1&e=VtSMA6](https://nemaorg137.sharepoint.com/:w:/r/sites/DICOMWG-07Radiotherapy/Shared%20Documents/General/WG-07_Document_Procedures.docx?d=w801cc72747b34ee1aa736746d59b0570&csf=1&web=1&e=VtSMA6)

## General Discussion

- FHIR and RT

- There is a division of application domains between DICOM (images, treatment planning, delivery, and reporting) and HL7/FHIR (EHR: prescription (?), patient management, treatment summary). This separation is expected to persist as parallel standards.
- FHIR is a dynamic messaging standard, rather than a persistent data representation.
  - FHIR can represent metadata for radiology, but (currently) not RT.
  - The [CodeX group](#) is working to develop RT treatment summary
  - The IHE-RO XRTS Profile addresses treatment summary metadata. Work on HL7 has been halted. Going forward, this work will use FHIR.
  - The IHE-RO XRTS group is meeting (21/1/20) to define scope, identify primary use case, finalize decision regarding coding standard.
- Interpretation of Target Prescription Dose Value
  - This topic was tabled.

## Correction Proposals

- **CP\_RT167** – adds documentation regarding inclusion of General Reference Module to overview tables in the Standard. Cleanup of documentation omitted in CP1559. No change to the requirements of the Standard. CP to be submitted to WG-06.
- **CP\_RT165** – clarification of Delivery Rate Unit specification in External Beam Control Point General Macro for consistency with existing Standard. CP to be submitted to WG-06.
- **CP RT166 Differentiate Geometric Types of CT Imaging Sources**
- Tabled (Yulong was not available). Further discussion at the next WG meeting
- **CP\_RT168** – Clarify Origin of Device Based FOR. Uli presented a draft CP. In the absence of an artifact (e.g., CBCT) representing the patient, the patient support system acts as a surrogate. The origin of the patient support system, and orientation of the patient with respect to the patient support, must be defined.
  - Image to Equipment Mapping Matrix defines the spatial relationship of patient to treatment equipment.
  - For use cases in which there is no image or other artifact, we want to use the table FOR as a surrogate. Use the Image to Equipment Mapping Matrix to specify table top location. Need to define where the origin of the table top coordinate system is located on the patient support device.
    - Proposal to use the Frame of Reference Origin Code to identify the location of the table top reference location.
    - FOR Origin Codes will be removed in favor of an alternative approach which involves documenting the use of a Well-Known FOR UID when there is no image or other artifact.
  - **ACTION:** U. Busch to adapt the CP as discussed for next meeting.

### CP 2037 Inner and Outer Contours

- Final Text in 2020e

## CP 2006 Unattached Contours

- Reviewed wording changes suggested by WG-06
- Christof presented DICOM and Small Lesions PPT reporting experiments in conversion of contour-based and pixel-based segmentations of small-volume ROIs.

## Supplements

- **Supplement 215 Ion**

- Definition of a reference point position for beam modifying device(s).
  - RT Device Distance Reference Location Code Sequence in the RT Delivery Device Common Module
    - ◆ Contains top-level reference position definition
    - ◆ May be overridden for other accessories
  - Discussion
    - ◆ Add RT Accessory Device Distance Reference Location Override – Type 3 Flag attribute? No – apply condition to RT Accessory Device Distance Reference Location Code Sequence.
    - ◆ New attribute: RT **Accessory** Device Distance Reference Location Code Sequence (Type 1C)
    - ◆ RT Beam Modifier Definition Distance
  - Accessory device diagram – David Wikler presented a “cheat sheet” representing 2<sup>nd</sup> Gen beam modifier concepts (posted in DICOM WG-07 Radiotherapy / Correction Proposals at Oct 23, 2020 9:45 AM) - The diagram distinguishes Accessory Holder as root node, Accessory Holder as non-root node, Accessory as leaf node.
  - **ACTION:** Jim to add new tag and update Ion diagram accordingly
- Modulated Scanning Beam Attributes
  - Scan Spot Prescribed Indices – required if RT Record Flag is YES and Scan Spot Rendered is YES.
  - Modulated Scanning Treatment Class Codes – can be used for display and cross-check of plan content.
  - At what level should the beam types be defined?
  - What baseline codes to include?
- Documents are to be consolidated in (top-level) Sup215 Ion Teams channel.

- **Supplement 213 RT Image**

- The group reviewed version 13 of Supplement 213.
- Open Issues for Public Comment:
  - Extended acquisition of CBCT
  - Constraints on Bits Allocated, Bits Stored, High Bit. Decision to require Bits Allocated to be 8 or 16 bits. Bits Stored equals Bits Allocated. (Ask if any other values are needed).
  - What about Curves? Overlays? - retired, not an option.

- 2D Presentation State can be used for annotation, but the overhead is substantial.
  - Additional information required by IEC Standards: should these attributes be required?
    - E.g., MV acquisition parameters (e.g., energy) and Radiation Type Code
    - Consensus that it is sufficient that DICOM can convey this information (and IEC Standards may change).
  - Functional Group Macros (Requirements for Shared and Per-Frame FG Macros)
    - Enhanced Continuous RT Image include Sparse Multi-Frame Functional Groups (need not be present in all frames). Macros are present in Selected Frame Functional Group Sequence. This is needed for streaming acquisitions in which there are a large number of frames.
    - How to interpret the value of parameters in frames that are not represented in the Selected Frame Functional Group Sequence? Selection of frames is specified as a sampling issue.
    - All FG that are present in Selected Functional Group Macros Sequence must be present in each item of that that Sequence.
    - Alternative wordings for Selected Functional Group requirements:
      - ◆ It is expected that values for frames whose per-frame Functional Group Macros are omitted but taken from the nearest neighbors are clinically acceptable.
      - ◆ It is expected that the frames are populated in such a way that it is clinically acceptable to take values for omitted frames from their nearest neighbors.
- **Supplement 178 RT Course**
  - Uli Busch reviewed the open issues in version 9 of the draft supplement.
  - Coding scheme for outcomes – work in progress in AAPM Big Data Subcommittee / SC263
  - Discussion of RT Course Use Cases
    - Summary of status and index to instances for ongoing radiotherapy treatment
    - Reference to instances for alternate treatment
    - Summary of prior treatment
    - Which Radiation Sets are in preparation?
    - Archiving of patient record
    - Multi-site hospital
    - Specialized view of radiotherapy course for referring/consulting physicians
    - Clinical Trial

- Research
- Two classes of Use Cases were identified: (1) workflow management in an integrated environment (Normalized Service) and (2) portable abstraction of data (as Composite Object) in a detached environment.
- Scoping is based on timeframe: all radiation therapy given to a patient from consult to completion of therapy (and follow-up images?)
- A receiving application may filter by treatment site, treatment modality, and the type of data objects to be extracted.
  - Additional categories?
  - Enrichment/indexing using analyzed data
  - Possible extensions?
  - Encode using Content Item Macro
- Future updates for RT Course. Can a sticky UID be used for this?
- Uli to post Use Case material from the discussion in Teams (Sup 178 RT Course).
- **Supplement 160 Setup**
  - Responses to comments (mostly editorial) have been incorporated in the DLB (draft for letter ballot) version of the Supplement draft.
  - The group reviewed several comments submitted by David Wikler.
  - Scope of RT Radiation Set Delivery Instruction is to deliver a single RT Treatment Fraction of one RT Radiation Set in one RT Session.
  - Discussion of adding RT Radiation Set Delivery Instruction IOD to RT Second Generation Entity-Relation Diagram. No additional Series semantics are attached to the Instruction IOD.
  - **ACTION:** Christof to update Figure 7.14-2 to reference RT Radiation Set Delivery Instruction.
  - Add PLAN to the Enumerated Values for Modality (0008,0060), add phrases identifying all enumerated values.
  - What is included in treatment *setup*? Discussion of whether additional detail is needed in the description.
  - Session-related issues discussed:
    - Treatment Session UID
    - RT Radiation Set Delivery Number (numbering of resumption sessions after partial delivery)?



- Proposal for (optional) Module to identify Treatment Session.
  - Change name of IOD to “RT Patient Treatment Preparation IOD”.
  - Specification of Delivery Device in Delivery Instruction Module. This device may differ from the device specified in the RT Radiation Instances.
  - Proposal to add chair headrest distance and tilt angle in PATIENT SETUP DEVICE PARAMETERS TID. This is to be added in Sup 215.
  - The RT Treatment Setup IOD has been renamed to “RT Treatment Preparation IOD”. The name of the Supplement was also changed to “Patient Setup and Delivery Instruction”.
  - Figure A.86 graphic has been extended to include instruction IODs.
  - Continuation End Meterset (0074,0121) - revise presence condition.
  - RT Treatment Setup Position Macro present in both the RT Treatment Preparation Instruction and in the RT Treatment Delivery Instruction.
    - RT Treatment Setup Position Macro was moved inside the (single-item) RT Patient Treatment Setup Position Sequence. This macro overrides the macro content in a referenced RT Patient Treatment Preparation IOD (if present).
  - Referenced RT Patient Setup Sequence has been retired.
  - Part 15
    - Patient Setup UID is retired
    - Attribute level confidentiality requirements for
      - ◆ Referenced Treatment Position Group UID
      - ◆ Patient Setup Method Description
      - ◆ Displacement Reference Label
  - Revise description of RT Patient Treatment Preparation Module (C.36.m2)
  - Change “Patient Setup Sequence” to “RT Patient Treatment Preparation Sequence”. Retain other “Patient Setup...” names
- **Supplement 177 Dose**
  - Some reformatting is still needed. WG-07 members plan to review this Supplement for internal review at the next meeting(s).
- **Supplement 196 Segmentation Template**
  - WG-06 has inquired about whether to retire this Supplement and the group believes work should continue.

## Old/New Business

- **Future WG-07 Meetings**
  - Feb 15-16, 2021 and Feb 23-24, 2021
    - **ACTION:** Shayna to schedule
  - Apr 12-13, 2021 and Apr 26-27, 2021
  - Jun 7-8, 2021 and Jun 14-15, 2021
  - Aug 2021 – TBD
  - Nov 2021 – TBD
  
- The meeting was adjourned on December 8, 2020 at 12:58pm ET.

Prepared and submitted by Shayna Knazik  
Reviewed by Counsel 2/9/2021