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## Meeting Minutes

### DICOM WORKING GROUP SEVEN (RADIOTHERAPY)

<b>Meeting Location</b>	Online Meeting		
<b>Dates and Times</b>	October, 12-13, 19-20		
	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

<b>Name</b>	<b>Affiliation</b>	<b>10/12</b>	<b>10/13</b>	<b>10/19</b>	<b>10/20</b>
Jim Percy	Elekta	X	X	X	X
Walter Bosch	AAPM	X	X	X	X
Yulong Yan	AAPM	X	X	X	X
Bruce Curran	AAPM	X	X	X	X
Bruce Rakes	Mevion	X	X	X	
Bob Pekarek	Accuray	X	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		
Stefan Pall Boman	RaySearch	X	X	X	X
Hansen Chen	Philips	X	X		X
Jon Treffert	RaySearch	X	X	X	
Shayna Knazik	NEMA	X	X	X	X

## Actual Week Schedule

	10/12	10/13	10/19	10/20
Session 1 09:00-09:55	Setup, Administrative, Opening Group Status	Sup177	Sup215	CPs
Session 2 10:00-10:50	Sup177	Sup177	Sup215	Sup178
Session 3 11:10-12:00	Sup177	Sup177	Sup215	Sup178
Session 4 12:05-13:00	Sup177	Sup177 Agenda Update Project List	Sup177	Sup178 CP (CBCT)

# Topics

## Administrative

1. Introductions, identified participants.
2. Shayna Knazik reminded the group of anti-trust rules and DICOM Patent Disclosure Policy.
3. Reviewed the agenda and revised as needed.
4. Review of meeting minutes was deferred.

## Subgroups and related Group Status

Update reports were presented as needed:

1. Brachytherapy Subgroup (Jim Percy)
2. Ion Subgroup (David Wikler) - focus on review of Supp 215
3. Motion Management Subgroup (Bob Pekarek) - group is on sabbatical
4. IHE-RO (Jon Treffert)
  - a. Technical committee meeting Oct 5-9 included productive discussion on brachy, coordinate system for non-isocentric imaging, secure DICOM
  - b. DRRO Profile was promoted to public comment
  - c. updates on profile status
  - d. Development XRTS, ROTH, Offline recording, and abbreviated dose reporting Profiles
  - e. RFP for Test Tools has been released
  - f. Virtual Connectathon is in preparation
5. AAMI/AdvaMed RT-03 Machine Characterization (Jim Percy) - no update at this time
6. IEC (Jim Percy) - 61217 discussion later this meeting
7. WG-28 – meeting Oct 21-23 to work on Supp 201, 214, CP 1196
8. DICOM has acquired a license for Confluence. If helpful, WG-07 can use this platform for offline collaboration.

## Organizational

Comments on Teams?

1. Some concerns regarding working across multiple Teams environments (company and NEMA)
2. WG-07 to continue using Teams for now.
  - a. ACTION: Shayna to create groups to be created within the DICOM WG-07 for the following
    - i. Ion Therapy
    - ii. Brachytherapy
  - b. ACTION: Jim to provide Shayna a roster of members for the Ion Therapy and Brachytherapy sub-groups.

Does file sync with OneDrive work for everybody? This feature is not widely used.

## General Discussions

IEC 61217 Ed. 3

J. Percy and C. Schadt have drafted a letter to IEC regarding the work on IEC 61217 Ed. 3. The group should review this and agree on next steps.

Concern was expressed that changes in proposed edition of the IEC 61217 would not be backward compatible. A new edition of the standard would render the current edition obsolete. Changing the meaning of the 61217 could lead to confusion and would degrade safety.

IEC 61217 is referenced by other standards. The DICOM Standard is linked to (geometric definitions of) IEC 61217. Removal of these geometric definitions is problematic.

WG-07 should prepare a constructive alternative to scale back changes.

See DICOMWG-07\_IEC61217\_Ed3\_Concerns.docx

FHIR (item was tabled)

~~How is this affecting RT? Or more directly 2<sup>nd</sup> Generation, especially the RT Physician Intent? Or the RT Course? Should we discuss this becoming a resource instead?~~

~~Are there any efforts regarding RT resources? How can/should WG-07 contribute?~~

Project Status Review (10/13/20)

1. Sup 177 Dose Objects = priority 1
2. Sup 178 RT Treatment Course = priority 2
3. Sup 215 RT Ion Radiations = priority 3
4. Sup NN2 Treatment Session Record = priority 4

## Supplements

### Supplement 177 – RT Dose

Open Item review

1. Item 64
  - a. Rename to “Calibration Identification Sequence” to “Pixel Conversion Identification Sequence” – Jim to fix names and descriptions of remaining tags in this Sequence.
  - b. Discussion of RT Value Conversion Type Code. Calibration Type Code Sequence was made Type 2. No generic Calibration Code was added to CID SUP177007.
  - c. ACTION: Jim to review, rationalize Calibration Codes in SUP177007.
2. Item 91 - “See C.36.2.2.macro.2” was removed. This note has been removed since all combinations are linear. Item was resolved.
3. Item 92 – description is adequate – Item has been resolved.

4. Item 95, 97 – Dose ensembles have been removed from the supplement. Items were resolved.
5. Item 98 – Effective Dose Calculation Parameters
  - a. Some parameters are ROI-specific. Biological parameters are stored in Segment Annotation. ROIs are referenced by CV UID.
  - b. Radiobiological dose calculation methods are represented in Table C.36.2.1.5-1 “Radiobiological Dose Effect Description Macro Attributes”
    - i. CID 9537 Effective Dose Calculation Method Categories
    - ii. CID 9538 Radiation Transport-based Effective Dose Method Modifiers
    - iii. CID 9539 Fractionation-based Effective Dose Method Modifiers

[Meeting adjourned 10/12/20 at 1:00pm ET]

[Meeting resumed 10/13/20 at 9:08am ET]

6. Item 98 (continued) - Parameters used for Effective Dose calculation.
  - a. ROI-specific parameters are recorded in Segment Annotation.
  - b. Additional parameters to be annotated in the Effective Dose Calculation Method Description (3010,0005). Decision that this representation is adequate. Item resolved.
7. Item 99 – resolved homogeneous material codes for dose calculation
8. Item 103 – Dose Unit Code Sequence (gggg,1250) was moved to Dose Context Macro. It is shared by all three IODs.
9. Item 104 – Dose calculation logs. Options for storing unstructured information (option c recommended) This item was resolved.
  - a. Unlimited Text attribute in dose IOD
  - b. Acquisition Context Module of Parametric Map
  - c. Raw Data Instance referenced from Pertinent Documents Sequence
10. Item 87 – Review/revise Code Definitions. Finalized codes and descriptions for image Pixel conversion calibrations. Resolved.
11. Item 86 – reaffirmed intent to keep use of NaN (or Floating Point Pixel Padding Value) to represent missing dose values in dose map as an Open Issue in Sup177 for Public Comment.
12. Approval status of pixel conversion calibrations was discussed – this topic to be revisited with an aim to represent approval status in a consistent manner across IODs.
  - a. Approval of *historic facts*, i.e., the process or data used to create an Instance, can be included in an IOD. Other approvals must be represented separately.
13. Item 102 (linked to 48) - Dose calculation algorithm parameters. Resolved.
  - a. Radiation Device Configuration and Commissioning Key Sequence (300A,065A) is an existing tag.
  - b. Algorithm Parameters Tag in the Algorithm Identification Macro shall not be present.
14. Outstanding issues (10/13/20)
  - a. Missing dose values – NaN or Floating Point Pixel Padding Value
  - b. Dose Units in RT Dose Map Annotation IOD

[Meeting adjourned 10/13/20 at 1:00pm ET]

[Meeting resumed 10/19/20 at 9:15am ET]

## Supplement 215 – Ion 2<sup>nd</sup> Gen

### Open Item review

1. RT Accessory Device positions
  - a. Jim Percy distributed “Ion Gantry and Nozzle diagram 3.ppt” document to the group. (Slide 1 is obsolete.)
  - b. RT Device Distance Reference Location Code Sequence within the RT Accessory Device Identification Macro. This Sequence is required if the reference location differs from that of the delivery device.
    - i. Concern that maintaining a multiplicity of reference locations is not helpful. How many reference locations to specify? How many distances from reference locations to include?
    - ii. Beam Modifier Coordinate System (C.36.1.1.9) specifies a common Base Beam Modifier Definition Plane.
  - c. For each accessory, location is specified by
    - i. Distance
    - ii. External reference point (on machine)
    - iii. Local reference point (on accessory)
  - d. For MLC and block tray, the reference location is the proximal end of snout.
  - e. Snout Position
    - i. The snout reference position is the machine isocenter.
    - ii. The fixed distance from isocenter is declared in the device definition. This distance defines a “zero position”.
    - iii. A relative offset from this position is specified in control point sequence.
    - iv. Accessory Holder – reference distance(s) for multiple slots. Slots are used for accessories that can be exchanged. Define reference location for slot distances in the RT Accessory Holder Definition Macro (C.36.2.2.14)
  - f. Keep Beam Limiting Device Angle attribute.
  - g. **ACTION:** Jim to complete editing of RT Accessory Device Macro.
    - i. Check attribute descriptions for device identification, distance, and reference location attributes.
    - ii. Check formatting of code values.
    - iii. Re-work example diagram to illustrate relative movement and showing Accessory Holder with and without slots.

## Supplement 177 – RT Dose

1. Dose Content Category Code Sequence (gggg,1285) was marked for deletion in RT Dose Parameters Module. This appears to be correct, as the module content has been moved to a library.
2. Purpose of Reference Code Sequence references CID SUP177004

3. Dose Representative Value codes – revised code values: ~~Calculated Global Maximum Dose, Representative Mean Dose, Representative Prescription Dose.~~
4. CID SUP177040 Dose Algorithm Classes – keep (S177071, 99SUP147, Other), remove (S177077, 99SUP147, Measurement-based)
5. Dose Reporting Material – revised definitions of Medium and Tissue.

[Meeting adjourned 10/19/20 at 1:00pm ET]

[Meeting resumed 10/20/20 at 9:11am ET]

## Correction Proposals

### CPs new to WG-07

#### cp RTNNN Cone Beam CT Types

Y. Yan was tasked to create a CP regarding the differentiation of a cone-beam CT scan vs. a fan-beam CT scan.

1. Primary use case is distinguishing CBCT Series from planning CTs.
2. Proposal also includes an attribute to distinguish acquisition modes or geometries. (Imaging Geometry Type (0018,????)).
3. An earlier, CP (804) encoded this information in the 4<sup>th</sup> value of the Image Type attribute, but was rejected.
4. Projection Technique (xxxx,yyyy) attribute to identify both source and detector geometry. Defined terms: PENCIL\_BEAM, FAN\_BEAM, CONE\_BEAM, HALFCONE\_BEAM.

Review of term definitions provided by Yulong

#### Beam Geometry

1. PENCIL\_BEAM
2. FAN\_BEAM
3. CONE\_BEAM

#### Source Collimation

1. HALF\_CONE
2. FULL\_CONE

#### Source Trajectory

1. FULL\_ROT
2. PARTIAL\_ROT

#### cp RT 164 RT Accessory Device Clarifications

The group reviewed wording of the CP. No changes were proposed.



## Supplement 178 – RT Course

Uli presented revision 8 of the document (sup178\_08\_RTCourse.doc). This supplement has been in development for many years. Style has been updated and RT Prescription Module content has been updated.

1. Scope and Field of Application – the Supplement now defines both Composite IOD(s) and a Normalized Service.
2. A clear definition of “Course” is needed. RT Course is a container for everything that is used to treat a patient.
  - a. Diagnosis
  - b. Prescription(s)
  - c. Time period
  - d. Disease site(s)
3. Deliverable: Annotated references to (active) information object instances and their states
4. Two major parts
  - a. Pointers to Prescriptions
  - b. Pointers to Radiation Sets and related instances
5. Consumers of the RT Course object:
  - a. Prescribing physician
  - b. Historical review for re-treatment or analysis
6. Producer: Treatment Management System acts as a concentrator of information regarding the state of a patient’s treatment.

### Walk-thru of Supplement 178 text

1. RT Treatment Phase – may be used to describe multiple treatment phases, modalities
2. RT Prescription Reference Presence Flag – indicates whether information about RT Radiation Sets in the current SOP instance reflects COMPLETE or PARTIAL information about the patient’s treatment.
3. RT Prescription Reference Module
  - a. references one or more Prescriptions
  - b. Contains RT Item State Macro to record the state of each prescription
  - c. Assessed Item Role Code – identifies purpose (role) for which a prescription is approved.
  - d. Active Item Indicator: ACTIVE or HISTORIC
  - e. RT Item State Creation Authority
  - f. RT Prescription Predecessor Sequence provides a shortcut to a predecessor prescription.
  - g. Related Instance Sequence – used to reference Segment Annotations/Segmentations, Images, Registrations, Doses ... (all related Instances which are subject to approval)
4. RT Radiation Set Reference Module

- a. “Meta RT Radiation Set” – concept introduced to deal with adaptive radiotherapy treatments
- 5. Query/Retrieval keys
  - a. By date range
  - b. Disease site
  - c. GET\_LATEST Service

Uli to update PowerPoint Presentation for Sup 178

**Next Meeting**

Nov 30, Dec 1, Dec 7-8, 2020, 9:00am – 1:00pm ET

[Meeting adjourned 10/20/20 at 1:00pm ET]

Prepared by Walter Bosch

Submitted by Shayna Knazik

Reviewed by Counsel Peter Tolsdorf