IHE-RO Technical Committee
Face-to-Face
Oct 22, 2018 at 8:30-12:00 CET
AAPM HQ
Alexandria, VA

Technical Committee Chairs:
Scott Hadley, PhD, University of Michigan
Chris Pauer, Sun Nuclear

IHERO Task Force Co-Chairs
Bruce Curran, MS, ME, FAAPM, FACMP, FACR, AAPM / VCU Health
Bridget Koontz, MD

Mission Statement: *The American Society for Radiation Oncology (ASTRO) has formed a multi-society Task Force to undertake an initiative to promote the Integration of the Healthcare Enterprise (IHE) – Radiation Oncology (RO), fostering seamless connectivity and integration of radiotherapy equipment and the patient health information systems. The Task Force will include members from ASTRO, RSNA, American Association of Physicists in Medicine (AAPM), the American College of Radiology (ACR) and the Medical Imaging and Technology Alliance (MITA). In addition, members of the International community have also been invited to participate in IHE-RO. The IHE-RO Task Force, in close collaboration with radiotherapy product manufacturers, will develop appropriate integration profiles for radiation therapy and setup a demonstration of seamless communication among the full array of radiotherapy products.*

In Attendance:

Jill Moton, AAPM
Scott Hadley, U. Mich
Walter Bosch, WU/ATC
Bruce Curran, VCU
Stefan Boman, RaySearch
Jim Percy, Elekta
Thomas Schwere, Varian
Bruce Rakes, Mevion
Bob Pekarek, Accuray
Joao Neta, Varian
Bharatesh Bedke, Varian
Raimo Nikkila, Varian
Koua Yang, Philips
Rishabh Kapoor, VCU

Agenda

A. Call to Order at 8:30 am EDT
    1. Quorum was declared
    2. Review topics

B. Business
    1. Review of connectathon results
        a. BRTO-II - 8 Actors, 4 Vendors passed
            - Bruce presented BRTO-II results
            - The TC approved the judges' recommendation of BRTO-II test results without objections or abstentions.
        b. MMRO-III – 9 Actors, 3 Vendors passed (6 passed with single test partners)
            - Rishabh presented MMRO-III results
            - The judges have recommended passing several Actors with single test partners and successful content validation.
            - The TC approved the judges' recommendation of MMRO-III test results without objections or abstentions.

- It was noted that non-unity transformations require different Frames of Reference UIDs (requires new instances of images). This is stated in the Profile.

c. TPPC – 31 Producers, 28 Consumers passed (36 passed with single test partners)
   - Scott presented TPPC results
   - The judges have recommended passing several Actors with single test partners and successful content validation.
   - Effective Wedge Angle for Motorize Wedge was discussed. There was some variation in sent and re-calculated values for this attribute. This is a nominal value and is required to be produced, but not required to be consumed.
   - The TC approved the judges' recommendation of TPPC test results without objections or abstentions.

2. Improved Test Tools (Content Validator)
   a. Focus on a single Content Validator, rather than Profile-based tools has been helpful.
   b. Participant engagement (communication of issues to ICT) has been instrumental in improving the quality of Test Tools.
   c. ICT responsiveness has improved – ICT produced three releases during the week of the Connectathon.
   d. Current tools require ICT to update rules.

3. Profile Issues raised during testing
   a. Minor bug in TPPC regarding indentation of an attribute Application Aperture Shape (300A,0432)
   b. MMRO-III "The *SECOND* FoR will define the spatial reg from the specified FoR to the registered FoR" (MMROIII_SRM_3)
      - Revise Attribute note to clarify requirements for Registration Sequence items:

Registration Sequence	(0070,0308)	R	A sequence of 2 registration items. One Frame of Reference will be to the Registered Frame of Reference, the second will define the spatial registration from the specified Frame of Reference to the Registered Frame of Reference.
			A sequence of 2 registration items. One Frame of Reference will be to the Registered Frame of Reference, the other will define the spatial registration from the specified Frame of Reference to the Registered Frame of Reference. The order of these items is not significant.

   c. TPPC requires Referenced Dose Reference UID (300A,0083) Type 3 to be present (R+*). This attribute was added in CP 1659 to the 2017A edition of the standard. It is not present in the referenced 2015A edition.
   d. BRTO-II Accession Number is in the Copy Table, but not in the General Study Module Table 7.4.1.2.1
      - Sven to add Accession Number to the General Study Module Table
   e. Consistency of Study-level Attributes
      - Add note to Technical Framework regarding creating new instances.
        - In BRTO-II, when storing an RT Structure Set, if changes are required in the Study level attributes, then the Structure Set must be created in a new Study.
      - There is an inconsistency between Study requirements for RT Structure Set in BRTO-II section 3.8.4.1.2 and the Study Handling table in section 7.2.3:

3.8.4.1.2 Message Semantics

…. In particular, the RT Structure Set must have the same Study Instance UID, but a different Series Instance UID than the CT series upon which the contours are based. Additionally, the attributes mentioned in section **Error! Reference source not found.**have to be present according to their requirements.

7.2.3 Study Handling

Attribute (Tag)	CT Image	RT Structure Set	Geometric RT Plan	Dosimetric RT Plan	RT Dose	RT Treatment Record
Study Instance UID (0020,000D)	Source	New Source (May Copy *)	Copy	Copy	Copy	Copy

f. TPPC SSD, Source to Block Tray distance
   - SSD was removed from TPPC. SSD is needed for FIXED_SSD treatments, e.g., Electrons.
   - ACTION 180901: Sven to review requirements for SSD in Static Electrons Beam Type. TC to consider restoring requirements this attribute.

g. TPPC Dose Rate Issue
   - One vendor wants to remove this value from plans they produce. However, some treatments (e.g., VMAT) may not deliver correctly at default dose rate. Explicit setting of Dose Rate may be needed.
   - ACTION 180902: Add Dose Rate in TPPC to next TC F2F Agenda.

h. Motorized Wedge – Effective Wedge Angle
   - Effective Wedge Angle for Motorized Wedge is a nominal value and is required to be produced, but not required to be consumed.
   - Remove requirement for TMS: "required to consume and process".

4. Test Tool Issues raised during testing
   a. Wrong rule for RT Dose IOD - Instance Number for RT Dose IOD is completely useless. We should add a note in 7.4.13.3.1 "RT Dose Module Base Content" of BRTO-II that Instance Number for RT Dose Module is actually Type 3 (overruling the definition in the General Image Module). Furthermore the error reported in the IHE-RO Content Validator regarding the Instance Number in RT Dose IOD should be ignored.
   b. IHE-RO TC recently removed Source To Surface Distance (300A,0130) and Source To External Contour Distance (300A,0132) as required attributes from the TPPC profile. This change is not yet incorporated into the IHE-RO Content Validator as of 8/22/18.
   c. Content validator False Positive: CV reports SourceToExternalContourDistance (300A,0132) missing when Patient Setup Technique is FIXED_SSD. This has been removed from the Profile.

5. Test Data Issues raised during testing
   a. Error in TPPC18A03xx – missing ROI Interpreted type for one or more structures
   b. Error in TPPC18A04xx – empty Study ID attribute in CT – copied to Plan – reported as error in Content Validation
   c. Test data do not include a CT Series with non-uniform slice thickness/spacing for testing image re-sampling

6. Other Issues raised during testing
   a. Pinnacle does not accept Patient Names with embedded ".". BRTO18A11AC (with RT Structure Set created by Accuray has been edited as BRTO18A11AC2 to remove the period (".") from the Patient's Name attribute.
   b. BRTO18A12VI structure set appears to have off-slice contours
   c. Brainlab does create an SRO for MMRO dataset(7) which is in the same FOR. The exported SRO has the same FOR for primary and secondary datasets.
   d. The use of series description / content description (0070,0081) on SRO. Need for improved management/query/retrieval. of SRO instances.
      - Instance level identification of Spatial Registration is similar to RT Structure Set, RT (Ion) Plan, RT Dose
      - RT Image and Beam Dose instances may constitute a distinct Use Case.
      - This may be included in the Query Retrieve Profile
      - This topic should be included in future TC agenda

   e. Machine model for Halcyon, ViewRay, Unity, and Tomo? How to incorporate these technologies in existing Profiles?
      - Multiple, co-directional MLCs – how to encode in DICOM?

        - Use BLD X jaws with multiple leaves?
        - "Virtual" (composite) MLC
    - BRTO-II Dosimetric Plan Requirements are minimal. The Plan is used to link dose to structure set and CTs.
    - Currently, Dose Displayer Actors are also Dosimetric Planners.
    - Dosimetric Planners should be able to display images, structures, and dose without a machine model.
    - ACTION 180903: IHE-RO judges to consider creating a unit test for Dose Displayer with a *minimal* plan.

7. Plans for Next Connectathon
    a. Consider TDW-II formal testing
    b. Domain pre-testing for informal testing, perhaps after TC.
    c. Next Connectathon is tentatively scheduled for Munich, October 7-12 2019.

8. Suggestions for improving the test process

C. Meeting adjourned at 12:00 pm EDT 10/22/18