IHE-RO Technical Committee
Face-to-Face with Conference call
May 4-5, 2014 at 8:30-5:30 PM ET, 8:30-12:00 on May 6

Technical Committee Chairs:
Bruce Curran, MS, ME
Chris Pauer, Accuray

IHERO Task Force Co-Chairs
Dick Fraass, Ph.D., FAAPM, FASTRO, FACR
John Buatti, MD

Mission Statement: *The American Society for Radiology 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.*

Attendees:

Name	Affiliation	5/4/14	5/5/14	5/6/14
Bruce Curran	Brown Univ.	X	X	X
Chris Pauer	Accuray	X	X	X
Jim Percy	Elekta	X	X	X
Walter Bosch	Wash. Univ./ATC	X	X	X
Bill Bennett	Wash. Univ./ATC	X	X	X
Uli Busch	Varian	X	X	X
Sven Siekmann	Brainlab	X	X	X
Christof Schadt	Brainlab	X	X	X
Rickard Holmberg	RaySearch Labs	X	X	X
Koua Yang	Philips	X	X	X
Sanjay Bari	Elekta	X		

Minutes:

I. Call to Order (5/4/14 at 8:45 am)
    a. Review Agenda
    b. Approval of minutes from Feb 2014 meeting – **approved without objection**
    c. Other broad topics to add

II. Business
    a. Topic 1: Level Set
        i. Updates on IHE-RO activities
            1. Planning, Oversight, Steering Committees –
                a. Bridget Koontz has been working actively in organizing the Clinical Advisory Committee
                b. Eight Clinical Impact Statements (TDW, TDW-II, DCOM, MMRO-III, QAPV, DPDW, TPIC, DRRO) have Clinical Advisory commitment. Five others are waiting for a Clinical Advisory Champion.
            2. ICT Contracts - The ICT Support contract started in late February 2014. (Test Tools link on ihe-ro.org documents ICT support activity.) Further discussion regarding backlog and test data issues later on this agenda.
            3. Washington U. Support Update – Continuing support for connectathon test management is needed. ACTION: Walter to provide a proposal for Test Management and Support services to ASTRO.
        ii. ASTRO news – The ASTRO Guidelines Committee is developing Guidelines and Best Practices. The Measures Committee is discussing quality measures be used to assess conformance to guidelines and may be a basis for reimbursement. IHE-RO may be asked to help in development of a standard interface for reporting quality metrics may be needed to facilitate reporting.
        iii. DICOM Update
            1. DICOM WG-7 had a productive meeting in March 2014. Work has begun on companion objects to collect semantically related objects. Review of Supp 147 continues with WG-6.
            2. Discussion of other WG-7 related meetings at AAPM
                a. Presentation to vendor engineers regarding 2nd Gen RT objects
                b. Meetings with IEC representatives, RT workflow experts, and brachy physicists.
            3. Work on CPs included the following:
                Finished or on the way to final text:
                cp1343 - Add Patient Photo to Patient Identification Modules
                cp1344 - Clarify Type Requirements In Unified Worklist
                cp1292 - Concept Code For Beam Delivery Instruction
                cp1399 - Effective Wedge Angle
                cp1393 - Correct Tag Numbers For BLD Adjusted Positions
                In discussion / preparation
                cp1288 - Add templates and code definitions for QAPV support
                cp1319 - Frame Of Reference Reliability
                cp1345 - Add Related UPS Sequence
        iv. Machine Characterization – An XML schema for machine characterization has been drafted. Discussion continues regarding how to authenticate an original vendor specification (as opposed to a user-modified version).

a. Topic 2:Connectathon Update
    i. Overview of Week
    ii. Gazelle Status
        1. Vendors were able to use Gazelle to schedule tests and manage worklists. Display of test progress was helpful.
        2. A small number of test monitors used the system to record test results.
        3. Random order of actors (producer, consumer, archive) in test display is annoying. Automatic refresh of monitor worklists would be helpful.
        4. Configuration of ARTI testing at the level of Beam Type Actors was not well matched to judging workflow (system-to-system). Test results were tracked using spreadsheets at the System level. Could re-structure system tests as a set of beam types, skipping the ones that are not used.
        5. Consensus that most of the difficulties are related to learning curve.
        6. Gazelle suggestions:
            a. Need to understand and pre-define registrations
            b. Need better planning and testing instructions to clarify how to create Actor datasets.
            c. Judges need to meet before connectathon to work out test procedures/instructions
            d. DECISION: Continue to use Gazelle to test ARTI. Extend Gazelle support to other Profiles: BRTO, MMRO, DCOM
        7. Fall 2014 Connectathon Scheduling ACTIONS:
            a. Prepare test data prior to connectathon for download and planning by ARTI Producer Actors and BRTO Contourers, MMRO Registrators. DCOM Single Plan Producers.
            b. Timeline
                i. Connectathon Registration (ASTRO) required by Aug 20, 2014
                ii. Gazelle registration to open by Aug 20, 2014
                iii. Connectathon Test Data to be ready for download no later than Sep 20, 2014
                iv. Participants to prepare Producer data for upload to Archive at the start of Connectathon.
                v. ASTRO meeting is Sep 14-18, 2014
                vi. Fall Connectathon date is Oct 6-10, 2014
        8. General suggestions:
            a. Restructure tests
            b. Allow vendors to enter *intended* tests ahead of time.
            c. Pre-connectathon staging – make test data available before connectathon.
            d. "Virtual" connectathon? (IHE-RO Japan is trying this on a limited basis)
    iii. Archive Results
        1. Lack of instance-level Q/R for RT object attributes, e.g., Plan Structure Set, Dose Label in image-based DICOM archives presents difficulties for retrieving data for IHE-RO profile testing. Using one instance per Series with Series Description to identify structure sets, plan, or doses does not work for vendors who export data with multiple RT instances in a Series.
        2. ACTION: Christof to provide Chris and Bruce with Toolkit vendor contact information for instance-level Q/R client by May 21.
        3. ACTION: Chris and Bruce to investigate licensing for instance-level Q/R utility with ASTRO by June 7.

    iv. Test Data Discussion

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1. <mark>ACTION</mark>: Bruce and Lakshmi to create instructions for planning on HFx images for FFx delivery by Aug 1, 2014.

2. <mark>ACTION:</mark> Bruce/Lakshmi to include request to create non-square dose grids, non-uniform grid-frame offsets in planning instructions for BRTO, DCOM profiles by Aug 1, 2014.

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3. <mark>ACTION:</mark> Bruce and Lakshmi to incorporate additional testing improvement suggestions by Aug 1, 2014:

 a. Change Elekta machine from Beam Modulator (EBM) to Agility (EAG)

 b. Remove Siemens machine

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 c. Allow Elekta Agility (EAG) machine to be used for Step and Shoot testing.

 d. Add clarification and explicit requirements regarding handling of Image Orientation (Patient) values.

4. <mark>ACTION:</mark> ICT to update Test Tools Data to match test instructions. Plan to be developed with ICT and progress to be reported on 5/15/14 TC call.

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 v. Connectathon hosting future

1. Physical space at ASTRO good, but connectivity was problematic

2. Network requirements:

 a. Wired with fixed addresses (no DHCP), internet access (100 Mbps should be sufficient, 2 switches, ~40 ports used)

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 b. Wireless with DHCP, internet access (15-30 systems, each with VPN)

 c. Minimum WAN bandwidth is at least 2Mbps (Brainlab Quentry)

3. Evaluate current site for improvement

 a. Group with 3 month deadline

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 b. Contact Harley with our intentions

 c. Contact building management directly / wiring provide directly

 d. Get guarantee on update, commit to testing/setup before Connectathon. If any of these fails, evaluate a new site.

4. Avoid holidays (vendors need access to back-office support)

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5. <mark>ACTION:</mark> Vendors to send bandwidth requirements for Internet access to Bruce and Chris by May 21, 2014.

  b. Topic 2.3.5 MMRO-III

   i. Image Orientation – What, if any, restrictions should be placed on the images to be

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registered? Limit to "orthogonal" image planes (normal to cardinal axes), i.e., Image Orientation (Patient) has only +/-1 and O values? Could impose this limitation for MMRO-II, but relax for MMRO-III.

   ii. Difference in behavior regarding the ability to draw/modify contours on primary, secondary, and resampled secondary images.

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  c. Topic 2.7 TP-PC

   i. Patient Position – Consensus to include HFS, HFP, FFS, FFP for both imaging and treatment.

   ii. MLC / Jaw issues – extra wide jaw – Consensus:

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1. For a single jaw MLC system, the aperture must be specified as an MLC: static beam is not supported.

2. For machines with two jaws + 1 MLC, only jaws are sent for Basic Static, Arc Beam, Stereotactic, Stereotactic Arc and Electron Beam.

3. In all applicator fields, MLCs are allowed, as well as collimator jaws.

      d. Topic 2.9: IHE-RO.ORG and BBS Discussion
- i. Minutes and final text profile documents are on www.ihe.net (available to all IHE domains)
- ii. Sub-group minutes are linked on wiki.ihe.net (managed by Bruce)
- iii. Profile documents are distributed as PDF on wiki.ihe.net and as .DOCX on ihe-ro.org
- iv. <mark>ACTION:</mark> Chris to distribute ihe-ro.org FTP credentials for document upload to appropriate TC members by May 15, 2014.

[Adjourned 5/4/14 at 5:30 pm]
[Resumed 5/5/14 at 9:00 am]

      e. Topic 3.0 : Revisit Overview of Profiles
- i. Uli presented an update of a Profile Map relating (reusable) Content profiles and the Use Case/Workflow profiles that depend on them.
- ii. Content profiles could be documented in TF Vol. III (DICOM section) and would be shared across Use Case profiles with a dependency table in Vol. I, that identifies the Content Profiles on which each of the Use Case Profiles depend.
- iii. The group reviewed Appendix A of Vol. II to identify examples of issues:
  1. In General Study Module contains a table of identifiers that are to be preserved or may be modified across transactions of BRTO. These context-specific dependencies would be moved to a table in Volume II.
  2. Profile specific information is to be excluded from the Content.
  3. It is expected that Transaction Semantics in Volume II will reference Content in Volume III. Context-specific semantic requirements are documented with Transactions in Volume II.
  4. Remove transaction references in Content Notes. Replicate the requirements *text* from (RAD) profiles, rather than referencing the profiles.
  5. Emphasize that the Content specifications are *minimum requirements* for Radiation Oncology workflow. Other requirements may apply.
  6. Remove references to DICOM *release dates*.
  7. Start with Patient, Study, Series, Equipment, SOP Common requirements.

      f. Topic 3.1 Restructuring TF
- i. It was suggested that the TC explore what it would take to restructured TF, starting with BRTO, MMRO-II, TPPC/TDPC. No change in content is anticipated: the intent is to clarify profiles to minimize implicit requirements. It is expected that restructuring the TF is a year-long project. There was concern that this is a large effort.
- ii. <mark>ACTION:</mark> Bruce and Chris to examine Appendix A and divide into Profile-specific information (to go in Vol. II) and non-profile-specific sections (to go in Vol. III) by June 19, 2014. Appendix A to be re-structured and text to be edited appropriately. This will also require changes to MMRO, etc. Supplements:
  1. Modules tables in Appendix A.2 to remain in Appendix A
  2. Content in A.3 that is specific to a transaction to be moved to that transaction in Volume II.
  3. Content in A.3 that is common to multiple Profiles/Transactions to remain in Appendix A.
- iii. <mark>ACTION:</mark> Uli to draft TPIC, TDIC, TDPC as Content Profiles. One of these profiles to be prepared by Sep 18, 2014 TC F2F meeting.
- iv. <mark>DECISION:</mark> Identify restructured profiles with "-R" suffix.

g. Topic 3.5 BRTO (Topic I from 2/26)
   i. Revised version of BRTO is complete and has been submitted to IHE document librarian.

240   h. Topic 4 TP-IC, TD-IC, RT Image Issues(Item n in minutes)
   i. Origin of Beam Limiting Device in RT Image instances of type DRR
      1. There is no useful role for BLD information in an RT Image of type DRR.
      2. No Profile uses the Planned Verification Image Seq (300A,00CA). This sequence could eventually be deprecated.
245   ii. ACTION: TPS, TMS vendors to investigate the source of BLD and Diaphragm information in RT Image instances of type DRR and how/where it is used by April 8 (for discussion at next TC meeting) - Complete.
   i. Topic 5: QAPV
      i. QAPV Changes from DICOM review – CP1288 (Templates and Codes for QAPV
250   Support) was reviewed with WG-6 review on 4/1/2014. Changes were captured by Chris in version 11 of CP and saved as version 15. ACTION: Chris to complete update of CP 1288 and forward to Uli - Complete
      ii. ACTION: Chris to remove definitions from QAPV Profile and replace with references to CP1288. Updated version to be released on ihe-ro.org by June 19, 2014.
255   iii. ACTION: Chris to update CP1288 and forward to Uli by May 15, 2014.
      iv. ACTION: Chris to set up a meeting of QA vendors to review dose check parameters by June 19, 2014.
      v. ACTION: Chris to revisit a getting-started guide for UPS (ongoing).

260   j. Topic 6: DPDW
   i. The DPDW Workgroup had a Tcon in April. They are working the details for approx. 20 Transactions. Owners have been assigned. Almost all of the first drafts have been submitted.
   ii. Topics have included: Query of UPS (what content is returned from C-FIND),
265   Management of UPS, Station name handling, Local state machine of TSM, Worklist Service for notification of other actors.

[12:00 – 1:00 Break]

270   k. Topic 6.4 Connectathon Results
   i. 2014 Connectathon Results presented by Bruce Curran.
   ii. Proposal for a three-month delay in release of Connectathon results to allow vendors to submit test tool results.

275   l. Topic 6.4.5 Test Tools and Results
   i. Submission of 2014 Test Tool results is currently incomplete. The role of test tools in evaluating DICOM conformance and Profile adherence was discussed.
   ii. Concern was expressed that while Test Tool quality appears to have improved, the quality of test data remains problematic.
280   iii.
   iv. There was consensus that an issue reporting system is needed to communicate bugs to the Test Tool Vendor.
      1. Requirements for Test Tool Issue reporting:
         a. Direct entry to some ticketing system
285   b. Multiple person access per company
         c. Group to triage reports and assign priorities

2. A trouble ticket mechanism can be implemented in doku-wiki on the ihe-ro.org site.
v. ACTION: Bruce and Chris to discuss with ICT on May 12 call: (a) backlog document, (b) issue tracking for general access and (c) ICT capabilities regarding test data.
vi. ACTION: Vendors who use Test Tools to provide feedback on opportunities to improve Test Tools and test datasets to Bruce and Chris. Vendors should continue to log issues on the wiki until a ticket system is in place.

m. Topic 7: CPRO - Consistent Patient Identification across RO Development
    i. WG has been created, but has not yet met. Rishabh Kapoor named as interim chair, subject to his approval.
    ii. CT Sim system – support for Modality Worklist vs. UPS?

n. Topic 8:
    i. Data Transport Workgroup – Christof Schadt is chair
    ii. Scope includes Query, Transport, and Storage

o. Topic 9:
    i. RO-HIS Workgroup
    ii. Awaiting PC direction on Use Cases.
    iii. ACTION: Bruce to provide feedback from ASTRO HIT Cmte to Chris regarding next steps for RO-HIS Profile with IHE-RO Steering Committee by May 15 (next SC meeting).
    iv. Workgroup Actions:
        1. Action (1/16): Chris to remind group leaders to being meeting in Feb. Groups to provide updates at Feb 24-28 meeting. / Tickler Entries - Complete
        2. ACTION: Chris to set up WG pages on ihe-ro.org site (remove Profile discussion links for which there are WGs active, keep Profile discussion links for others) by May 15, 2014.

p. Topic 10: ARTI
    i. ACTION: Bruce to distribute to the TC an updated revision of ARTI with changes indicated by April 1: - Complete
        1. For Hard Wedge and Motorized Wedge the Wedge Angle parameter is to be interpreted the physical wedge angle.
        2. For Virtual Wedge the parameter is to be interpreted as the equivalent physical wedge angle.
    ii. ACTION: Bruce to issue email ballot for ARTI release to Final Text by May 21, 2014.
    iii. ACTION: Uli to refer action on addition of a new Effective Wedge Angle attribute in RT Plan to DICOM WG-7 for March 24 WG-7 meeting. - Complete

q. Topic 11: ROI Templates (see k on 2/26 in minutes)
    i. ACTION: Uli to make brief presentation to WG-6 to discuss the appropriateness of using DICOM non-patient objects for ROI Templates on March 31. - Complete
    ii. ACTION: Bruce and Chris to contact IHE to ask what constraints there are on organizations that issue standards referenced in IHE profiles by March 24 (next IHE DCC meeting). A call is scheduled with IHE Testing and Tools Committee on Thursday, May 8, 2014 to discuss this issue. (ongoing)

iii. <mark>ACTION:</mark> Walter to update ROI Template draft for consistency with Supp 147 and CP-1287 (to be included in DICOM 2013 edition) with respect to coding and ROI parameters – to revisit next TC June T-con.

iv. <mark>ACTION:</mark> Walter to review DICOM Part 19 as an example of XML encoding of DICOM for June T-con.

r. Topic 12 TDW-II

    i. Review of Query Key/Return requirements for Worklist Query for Treatment Delivery: semantics of "-" entries?

    ii. Beam delivery instruction – Proposal to require that the Current Fraction Number (3008,0022) and Fraction Group Number (300C,0022) for all beams treated in a session be the same.

    iii. <mark>Action (9/13):</mark> Uli to sort out the Concept Code for Treatment Delivery Type with WG-6 – CP is currently in letter ballot. (Results expected 3/31/14.) - <mark style="background-color:#00ff00">Complete</mark>

    iv. <mark>ACTION:</mark> Uli to update TDW-II Profile to clarify what "patient header data" means for Tx Record – by June 1, 2014

s. Topic 13.5 Online Archive Demo - Complete

t. Topic 14 – Synopsis of Activities for Clinical Advisory Group

    i. What are the current priorities for TC?
1. Improved Test Tools
2. Extensions/Improvements
   a. TDW-II (public comment 8/14)
   b. TPPC (Sept 2014 meeting focus, supp spring 2015)
   c. MMRO-III (?)
3. Have Significant Momentum, or are near Completion
   a. DPDW (multiple year, work ongoing)
   b. IPDW (needs to be scheduled with IHE)
   c. QAPV (remove DICOM CP material, QA vendor review again, then PC again, by Sept 2014)
4. Restructuring Technical Framework to
   a. Improve authoring efficiency for new profiles
   b. Clarify approach on content vs. workflow
   c. Improve consistency and readability
   d. (profile)-R (longer term)
5. Workgroup on Data Transport
6. Key New Profiles
   a. ROIT
   b. QRRO
   c. TDIC
   d. TPIC
   e. TDPC
   f. DRRO
   g. RXRO – 2nd Gen
7. Workgroups
   a. CPRO
   b. RO-HIS
8. Second Generation RT Specific Efforts
   a. Segmentation

        ii. What is the TC burn speed/throughput?
           1. Capacity for new profiles…
             a. TC endeavors to keep the TC members applying their expertise and time to the fullest extent we can, and have continued to set direction that makes sense to the clinical and vendor participants of the TC.
             b. TC will do what we are asked to do.
             c. We welcome new priorities with the belief that they will be set with realistic and measureable end results.
             d. Any new goals should be shuffled in with these current efforts.
           2. "Limited expert availability"
           3. Need to have better support, more experts
           4. ACTION: Chris to write up response and circulate to attendees prior to next TC teleconference.
        iii. What would TC feel are the priorities to get finished first?

[Adjourned 5/5/14 at 5:30 pm]
[Resumed 5/6/14 at 8:35 am]

    u. Topic 14.2 Informal Testing
        i. Concern was expressed that more frequent formal testing may reduce the time and resources available for informal testing.
        ii. Vendor personnel are the key resource for informal testing.
        iii. ACTION: Bruce to draft updated paragraph for the vendor Connectathon agreement regarding expectations for June 19, 2014. Add clauses on the importance of pre-testing and for providing support not only for their own product testing but also for other manufacturers participating in the Connectathon.
        iv. ACTION: Bruce and Chris to write thank you letters to vendor management. Draft by June 19, 2014. Participants to send Bruce contact information for management by June 19, 2014.
    v. Topic 14.3 Connectathon Preparation / pre-Connectathon staging
        i. Need to pre-load the data source sufficiently in time
        ii. Requirements
           1. BRTO – need new datasets in NON-HFS positions (FF, Prone)
           2. MMRO-II – keep datasets (5,6) in "non-orthogonal" planes, other data adequate
           3. ARTI – added prone dataset (to be used for at least 1, ~20% of beam plans); add SRS case if possible (small target); Rx needs to be fixed across beam types
           4. DCOM – currently using MMRO-II data to create single-plan dose
           5. TDW – no additional data needed.
        iii. Oct 2014 test event to be identified as "2014 *Fall* Connectathon"

II. Topic 14.5: Review Action Items

III. Topic 15: Future Meetings / Next Agenda
    a. IHE-RO Meetings
        i. IHE-RO Post-ASTRO TC meeting, Sep 17-20 (end 12pm on 20th), San Francisco
        ii. IHE-RO 2014 Fall Connectathon – Oct 6-10, TC mtg 12-15, Baden or Zug, Switzerland
         • Consider extending TC meetings after ASTRO, and test events.

   b. IHE-RO Teleconferences
     i. IHE-RO TC Teleconference, May 15, 2014, 1:00-2:30pm ET
440   ii. IHE-RO TC Teleconference, June 19, 2014, 1:00-2:30pm ET
     iii. (July teleconference cancelled)
     iv. IHE-RO TC Teleconference, Aug 21, 2014, 1:00-2:30pm ET
     v. (Sept teleconference cancelled)

445   ==ACTION:== Uli to confirm location (city) by June 1, 2014.
      ==ACTION:== Bruce to circulate proposed dates for IHE-RO TC winter 2014-15 meeting
      and 2015 Spring Connectathon by June 19, 2014.

   c. Other meetings through 2014
450   i. Mar 24-28 WG-7, NEMA, Washington, DC
      ii. Mar 31 WG-6, NEMA, Washington, DC
      iii. Apr 4-8 ESTRO, Vienna (possible meeting with IEC)
      iv. Jun 8-14 PTCOG, Shanghai
      v. Jul 20-24 AAPM, Austin, TX
455   vi. Jul 24-26 DICOM WG-7, Austin, TX
      vii. Sep 14-18 ASTRO, San Francisco, CA
      viii. Nov 3-7 DICOM WG-7, Washington, DC

  IV. Adjournment (5/6/14 at 11:15 am)
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