Minutes

Discrete Positioning and Delivery Workflow (DPDW)

Conference Call

February 4, 2014

11:00am – 12:00pm EST

DPDW Subgroup Chair:

Ulrich Busch, Varian Medical Systems

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.*

**In Attendance:**

Bruce Curran (Brown Univ.)

Sanjay Bari (Elekta)

Martin Vonach (Brainlab)

Harold Beunk (ITC)

Lisa Hampton (Varian)

Chris Lindop (GE Healthcare)

Rickard Holmberg (RaySearch)

Tony Johnson (CIVCO)

Andrea Morgan (Varian)

Ulrich Busch (Varian)

Tomas Schwere (Varian)

(For this first meeting, the minutes are divided in 1. a short summary for overview and 2. an appendix reporting the reports and discussions to have some elaborate introductory background spelled out this time).

# Call to Order

The meeting was started at 11:10 EST

# State of Specifications

The Chair reported on the proceedings throughout the last year until now.

Volume 1 of DPDW Profile is more or less in good shape. The transactions are defined and their roles and dependencies can be derived from the sequence diagrams in Volume 1. Most of the work ahead is to work out the transaction details. Assignments of transactions to authors prepared to work in concrete on these specifications are needed now. A pre-cursor for DPDW is available by IPDW, which is in trial state and ready for implementation.

Thomas Schwere presented the state of the Supplement 160 and made a walkthrough with group on the scope of that specification. This supplement contains Instruction and Result IODs, which are relevant for DPDW (and IPDW). The supplement has grown into a pretty complete first draft now. He will continue to work on the supplement as well as participate in the DPDW profile and taking care of keeping them in synch as needed.

Some questions about relation to first generation, timing etc. were discussed – details see appendix.

# Activities

## Review / Update of Transaction Assignments

The group started to look at the transaction assignments. Since the meeting run out of time, some assignments could be made already, but the updates could not be completed.

# Process / TCons / Meetings

A mailing list for the DPDW subgroup will be established by Amber Sims.

A TCon pattern and a potential face-to-face meeting was not discussed yet.

The next TCon was scheduled for:

* Thursday, February 13, 2014  
  11:00AM – 12:00 PM EST.

# Adjournment

The meeting was adjourned at 12:00 EST.

Appendix: Detailed Minutes

# Location of Documents

Documents are published at the following locations. If you have problems in accessing the document, please contact the Chair ([ulrich.busch@varian.com](mailto:ulrich.busch@varian.com)).

## DPDW

The DPDW Profile is an IHE-RO document. The current versions of the profiles are always available in the IHE-RO Org Wiki.

<http://www.ihe-ro.org/>

Please see the current document here:

<http://www.ihe-ro.org/doku.php?id=doc:profiles>

## Supp 160

DICOM Supplement 160 (Patient Positioning and Workflow) in s DICOM WG-07 document. It is available at the DICOM ftp server:

<ftp://d9-workgrps@medical.nema.org/MEDICAL/Private/Dicom/WORKGRPS/WG07/Supp160>

# State of Specifications

## Overall

The Chair reported on the proceedings throughout last year and the current state of the relevant documents and working threads. Formally, there are 2 working groups in that area:

* IHE-RO DPDW subgroup for that profile (chaired by Ulrich Busch)
* WG-07 PWF subgroup (chaired by Christof Schadt)

Both specifications (DPDW and Supp 160) are closely related:

* DPDW defines the communication protocols and sequences.
* Supp 160 provides the assets, namely the DICOM Instruction and Result IODs needed to convey the necessary data between the actors.

The protocol framework (Unified Worklist and Procedure Step) is already included in the DICOM Standard (since DICOM Standard 2011).

Because of the interdependency of DPDW and Supp 160, Ulrich Busch and Christof Schadt have determined, that we do not work separately in 2 working groups (DPDW subgroup and WG-07 PWF subgroup), but combine the proceedings in one thread.

After the meeting in Brussels, we continued working with DPDW Profile, incorporated various results from Brussels into the document, and actually made further progress.

We also assigned tasks for DPDW (see attached list) and had our last TCon in January 2013. However, no inputs were received besides the following:

* Martin Vonach provided various inputs for DPDW.
* Thomas Schwere has continued with Supp 160.  
  (The supplement has been so far mainly a proceeding of Christof Schadt and Ulrich Busch. Since those individuals have not been able to continue, the document was passed to Thomas Schwere, since he is working on Delivery Worklist Approaches anyways).

## DPDW Profile

The Chair reported on the state of the DPDW Profile specification:

The actual version referred to is 1.12, dated December 18, 2013 (access coordinates see above).

The Chair gave an overview of the DPDW profile to refresh the comprehension of that profile:

The profile is partitioned into 4 Sub-Profiles (at least for the time of authoring) to help contributors and readers to better navigate through the document (since the actual version, the sub-profiles are numbered DPDW 1-4):

* Treatment Session Workflow Profile (DPDW 1)  
  Prior to Treatment, exposure of all UPS and at the end of treatment, finalization of the UPS.
* Discrete Positioning Workflow Profile (DPDW 2)  
  Patient Positioning Prior to delivery of radiation.
* Discrete Delivery Workflow Profile (DPDW 3)  
  Delivery of Radiation without Monitoring / Tracking (alternative to DPDW 4)
* Discrete Delivery And Monitoring Profile (DPDW 4)  
  Delivery of Radiation with Monitoring / Tracking (alternative to DPDW 3)

As always in IHE, Volume 1 contains the use case definitions and the overview scenarios (which are essential in case of this profile to understand the approach). Volume 2 contains the transactions.

In preparation of the meeting, U. Busch did the following in the DPDW document: All DPDW Open Issues accumulated from the last discussions have been considered and could be mostly addressed. The scenarios have been completely re-visited and some adaptions / extensions to the list of transactions have been done. List of actors and transactions and mapping have been completed. Section skeletons for all transaction are prepared and partly annotated with some content.

In general though, the transaction specifications are basically empty. This is the main part of work to be done to go forward with the profile.

## Supplement 160

Thomas Schwere presented the state of the supplement 160.

The actual version referred to is version 17, dated December 18, 2013 (access coordinates see above).

This supplement contains the Instruction IODs and Result IODs which are needed to convey the information about the intended procedures from the TMS to the actors involved in delivery, and then further on from one actor to the other within the treatment session.

E.g. an image acquisition will generate images based on a UPS referencing an instruction how to do acquisition. Following this step, there will be procedure based on a UPS for registration associated with an instruction e.g. defining, whether to perform rigid or deformable registrations and which reference images to use. Another UPS will define the following positioning step and may have an instruction associated, e.g. containing an advice whether positioning should only be done in 4DoF or actually in 6DoF.

For a list of IODs designed in Supplement 160 and other information, see Presentation of T. Schwere (DPDW\_Supp160.ppt) distributed at the meeting.

Work will continue on that supplement in coordination with this group.

# Discussions

Various comments / remarks were made by Harold Beunk in respect to status, timing and use of first generation objects in IPDW (Integrated Positioning and Delivery Profile) and DPDW. The following summarizes the task about those:

The IPDW is currently in Trial implementation state and will remain there, until we have first implementations done. As experience has shown, at some implementations must precede the transition to final text, since first implementations typically reveal the need for some detail adjustment of such profiles. This was even observed on the pretty simple TDW profile. The same will apply to IPDW and DPDW.

The use of first generation objects is in principle possible in both IPDW and DPDW. The difficulty lies in the instructions and results IODs of Supplement 160, which will reference treatment plans and fields, segmentations etc. Those references will be designed using Supp 147 DICOM RT 2nd Generation objects (Radiations Sets, Radiations, RT Segment Annotation etc.). In a later phase we may look into options to keep the approaches compatible between 1st and 2nd Generation, but it's too early to guarantee that.

That is also a question of timing – in relation to first implementations the workflow-related profiles and of DICOM 2nd Generation RT. The IPDW profile is an extension of TDW including imaging etc., but with the same notion of actors: It is pretty straightforward in terms of the involved actors and process model. DPDW on the other side per nature defines a rather complex interplay of many separate actors and has a lot of dependencies between the transactions. However, what is shared between both profiles are the UPS definitions itself and the use of Instruction and Result IODs. An implementation of the IPDW will concentrate on those, since it has no complex process and state implications and by that will prepare the ground for DPDW –which then can concentrate on getting procedural sequence and dependencies managed.

Sanjay Bari stated that DPDW is important for all 3rd party devices like imaging devices etc. The Chair stated that this is definitely the purpose of DPDW and it is good to have that in mind. However, the statements above in respect to complexities etc. remains, and it is basically the question to this group how fast we can proceed to work out the detailed specification to be able to implement against those. Key for progress now are the specifications of the transactions.

We are looking for authors, which can actually work out the details of the transactions in compliance with the DICOM Standard and in coordination with the objects of Supplement 160.

Appendix: Task Assignments

This following list represents the input to the meeting with some changes, which have been done during the meeting. During the next meeting, the group should re-visit the list and finalize the assignments.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TX / Area | Old Number | Item | Group | Owner |
| ./. | ./. | Use Case Delivery-Device Independent Imaging |  | David Wikler |
| RO-DPD-200 | RO-DPD-01 | Worklist Query for Positioning Acquisition | Acquisition | Martin Vonach |
| RO-DPD-201 | RO-DPD-02 | Retrieve Device Position Information | Acquisition | Martin Vonach |
| RO-DPD-202 | RO-DPD-03 | Request RT Patient Position Correction | Correction | Martin Vonach |
| RO-DPD-203 | RO-DPD-04 | Store RT Patient Position Modification Instruction | Correction | Martin Vonach |
| RO-DPD-204 | RO-DPD-05 | Store RT Repositioning Results to Object Storage | Correction | Martin Vonach |
| RO-DPD-205 | RO-DPD-06 | Worklist Query for Repositioning | Correction | Martin Vonach |
| RO-DPD-206 | RO-DPD-07 | Notify on Radiation Delivery Status Change | Delivery | Thomas Schwere |
| RO-DPD-207 | RO-DPD-08 | Retrieve RT Patient Position Correction Instruction | Correction | Jaco Barnhoorn, Jurjen Weistra |
| RO-DPD-208 | RO-DPD-09 | Subscribe/Unsubscribe to Treat UPS Status | UPS Notification | Thomas Schwere |
| RO-DPD-209 | RO-DPD-10 | Notify on Radiation State | Delivery | Thomas Schwere |
| RO-DPD-210 | RO-DPD-11 | Retrieve Positioning Acquisition Results | Registration | Hakan MacLean |
| RO-DPD-211 | RO-DPD-12 | Worklist Query for Positioning Registration | Registration | Hakan MacLean |
| RO-DPD-212 | RO-DPD-13 | Worklist Query for Position Monitoring | Monitoring | Andrea Morgan |
| - removed - | RO-DPD-14 | Retrieve RT Patient Position Modification Instruction | Correction | Martin Vonach |
| - removed - | RO-DPD-15 | Store RT Patient Position Modification Result | Correction | Martin Vonach |
| RO-DPD-213 | RO-DPD-16 | Store Monitoring Results to Object Storage | Monitoring | Andrea Morgan |
| RO-DPD-214 | RO-DPD-17 | UPS Final Update at Session Termination | Framework | Thomas Schwere |
| RO-DPD-215 | RO-DPD-18 | UPS Completed / Cancelled at Session Termination | Framework | Thomas Schwere |
| RO-DPD-216 | RO-DPD-19 | Indicate Ready for Monitoring | Monitoring | Andrea Morgan |
| RO-DPD-217 | RO-DPD-20 | Notify Device to start UPS | UPS Notification | Thomas Schwere |
| RO-DPD-218 | RO-DPD-21 | Create Positioning Acquisition and Positioning Registration UPS | Workflow | Jaco Barnhoorn, Jurjen Weistra |
| RO-DPD-219 | RO-DPD-22 | Create Treat UPS and Radiation Delivery Instruction for Continuation | Workflow | Thomas Schwere |
| RO-DPD-220 | RO-DPD-23 | Notify Treatment Session Actors on Starting Session | UPS Notification | Thomas Schwere |
| RO-DPD-221 | RO-DPD-24 | Notify Device to stop UPS | UPS Notification | Thomas Schwere |
| RO-DPD-222 | RO-DPD-25 | UPS Progress Update for Discrete non-Treatment Steps | UPS Notification | Thomas Schwere |
| RO-DPD-223 | RO-DPD-26 | Worklist Query for Positiong Correction Reconciliation | Registration | Hakan MacLean |
| RO-DPD-224 | RO-DPD-27 | External Verification | External Verification | Sanjay Bari |
| RO-DPD-225 | ./. | Notify Device to resume UPS | Monitoring |  |
| RO-DPD-226 | ./. | Create new Positioning UPS | Monitoring |  |