Secretariat: MITA/NEMA
1300 North 17th Street, Suite 900
Arlington, VA 22209, USA
http://www.dicomstandard.org/
dicom@dicomstandard.org

MINUTES

WORKING GROUP TWENTY-ONE (Computed Tomography)

Version 2

Date & Time:	Wednesday, June 29, 2022 12:00-1:00pm US Eastern Time
Presiding Officers:	Till Hoenig, Co-Chair, Vendor Shuai Leng, Co-Chair, User *wg21chairs@dicomstandard.org*
Secretary:	Shayna Knazik, DICOM/MITA

Voting Members Present:	**Represented by:**
AAPM/Mayo Clinic	Shuai Leng
AAPM	Kai Yang
Canon	Kevin O'Donnell
DICOM/MITA	Shayna Knazik
GE Healthcare	Steve Nichols
Johns Hopkins University	M. Mahesh
Philips	Shlomo Gotman
Siemens Healthineers	Till Hoenig

Voting Members Not Present:	**Represented by:**
*ACR	Paul Armstrong Hill
*PixelMed Publishing	David Clunie
United Imaging Healthcare	Adam Chandler

*Not present at two consecutive meetings and therefore not counted for quorum during this tcon

Observers Present:	**Represented by:**
AAPM	Nick Bevins
Elekta	Jim Percy, Guest from WG-07

1. **Opening**
   1.1. The teleconference was called to order and a quorum was present.
   1.2. DICOM antitrust and patent guidelines were reviewed.

1.3. The agenda was reviewed and approved.
1.4. The minutes from 25 May 2022 were reviewed and approved.

2. WG-21 Correction Proposals (CPs) Summary

CP#	Submission Date	Submitter	Affects DICOM Parts	Assignee	Status	Description	Coded status
1915	2019-02-16	Hoenig	Part 3	Nolte	Suspended	Adapt definition of FocalSpot (0018,1190) to comply with IEC60336 section 8.3	n/a
<New>		Hoenig	Parts 3/16		New	Publicly document and specify vendor specific CT Image Quality Reference Parameter as a SQ	
2189	2021-10-26	Nichols	Parts 3 and 17	Nichols	Assigned	Add Multi-Energy Image type attribute to the Enhanced CT Image Storage SOP Class	Sept 2022 Voting Packet
2208	2022-01-06	Nichols	Part 16	Nichols	Assigned	Include additional cardiovascular terms to Part 16	Sept 2022 Voting Packet
2209	2022-01-20	Hoenig	Part 3	Nolte	New / submitted to WG-06	Correct Table C.11.1.1.2.1-1 Recommended Rescale Type Assignments for Multi-energy CT Image	Sept 2022 Voting Packet
2232	2022-03-21	Hoenig	Part 16	Nolte	New	Correct/add Body Part Examined Defined Terms in correspondence Table L-1	Sept 2022 Voting Packet
2233	2022-03-21	Hoenig	Part 16	Nolte	New	Switch to SNOMED Code for PHANTOM	Sept 2022 Voting Packet

3. Differentiate geometric types of CT imaging sources – CP-2220 from WG-07/Yulong Yan

3.1. David Clunie requested that WG-02 and WG-21 weigh in on this CP and let us know if it is okay and sufficient to describe the detectors. Jim Percy, WG-07 Co-Chair, joined the call to discuss with the group. The group provided feedback for Jim/WG-07 and he will make those changes before the July WG-21 teleconference.
3.2. Action: Shayna to keep this item on the WG-21 agenda for July.

4. 4D imaging representation in classic IODs

4.1. Jim also led the group through a review of a new CP proposal from Kari Jyrkkälä (WG-07) which is aiming at adding temporal information (respiratory, cardiac phases, ..) to the classic CT Image IOD as this information is encoded within the SeriesDescription in a vendor-specific format as of today which is hard/impossible to interpret.
The CP proposes to introduce a new module ("Temporal Imaging Series") for IE Series.

The group suggested to consider re-using existing Cardiac Synchronization / Respiratory Synchronization modules (from Enhanced IODs) for CT Image IOD instead.

Jim will bring the CP back to this group once WG-07 has another round of reviews at one of their upcoming teleconferences.

5. **Create a context group for calcium scoring – CP-2208 from Steve Nichols**

5.1. Steve provided an update on the feedback received from WG-01. He presented the CP at the WG-06 June meeting and it was accepted for the September 2022 Voting Packet. He will move this to the WG-06 September ftp folder and Shayna will remove this from future agendas unless Steve reaches out for additional WG-21 feedback.

6. **Image Type for Multi-Energy Enhanced CT images – CP-2189 from Steve Nichols**

6.1. Steve shared the feedback he received from WG-06 at the WG-06 June meeting and noted that this CP was accepted for the September 2022 Voting Packet. The group provided some additional comments which were incorporated. Steve will move this to the WG-06 September ftp folder and Shayna will remove this from future agendas unless Steve reaches out for additional WG-21 feedback.

7. **Content Time and Acquisition Time clarification – Shlomo Gotman/Wim Corbijn**

7.1. Background information on this item from Shlomo:

It seems the current definitions of Content Time (0008,0033) and Acquisition Time (0008,0032) are ambiguous:

Content Time	(0008,0033)	2C	The time the image pixel data creation started. Required if image is part of a Series in which the images are temporally related. May be present otherwise.
Acquisition Time	(0008,0032)	3	The time the acquisition of data that resulted in this image started

For certain applications, such as perfusion, it is critical to know the exact time of the acquisition that contributed to each reconstructed image, or at least temporal relation between these scans. Apparently, the "Content Time" shall contain such value if you look at the condition there ("image is part of a Series in which the images are temporally related"). If this assumption is correct, then it means:

1. The Content Time remains constant regardless of when the image reconstruction/generation started - in 1 sec, 1 hour or 1 day after acquisition, and
2. In Helical scan, each image will have a different Content Time, reflecting the time of the acquisition that resulted in that image.

The description of the Content Time ("the time the image pixel data creation started"), however, suggests something different: it looks like time when the reconstruction or generation of the image started. In this case, if you reconstruct images from the same raw data at different times, the Content Time will be different. In addition, in this case

one cannot trust the temporal relation between the images since it depends on the computer performance.

Is Acquisition Time less ambiguous and shall be used instead in those applications that require correct acquisition timing? It is Type 3, so it does not contain the condition present in the Content Time. Also, it is not clear what Acquisition Time shall be recorded in the Helical images -

It would be good to learn how different vendors interpret these two attributes. Is any clarification in the DICOM description needed (CP)?

7.2. The group discussed this item for a majority of the call but did not have time to come to any conclusions. There was consensus though that the current description of the time tags is ambiguous and shall be improved. It was noted that CP-1749, an old CP assigned to Kevin, addresses some of these topics.
- Action: Shlomo will investigate more based on the feedback received today.
- Action: Kevin will find the most recent copy of CP-1749 and touch base with David Clunie, then bring back to the group.
- Action: Shayna will add a reference to CP-1749 within this item to the next agenda, and invite Wim to the next call.

8. Additional public attribute for CT images, addressing the context "(User selectable) parameter that determines the tube current time product relevant for the image quality"

8.1. There was not enough time to discuss this item, but Shuai provided a very brief overview of the work he did since the WG-21 May teleconference.

8.2. Action: Shuai will circulate these documents to the group to consider before the next WG-21 teleconference.

8.3. Action: Shayna and team will investigate whether we have any DICOM contacts from Samsung, Hitachi, or Neurosoft.

9. Dose Management: Patient Protocol (Black Image) vs. RDSR

9.1. There was not enough time to discuss this item.

10. WG-06 requested WG-21 to review technical content of HL7 imaging procedure radiation exposure project

https://confluence.hl7.org/display/IMIN/Radiation+Dose+Summary+for+Diagnostic+Procedures+on+FHIR

10.1. There was not enough time to discuss this item.

11. Old/New Business

11.1. The group will discuss whether an in-person meeting for 2022 or 2023 at the July teleconference.

12. Upcoming meetings:

→WG-21 usually meets the 3rd Wednesday of each month at 12:00pm US Eastern. The next call was supposed to take place on July 20, 2022, but several members will be on vacation on

that date. The group identified August 10, 2022 from 1:00-2:30pm US Eastern as the best time to meet. The group determined that a 90-minute call will be necessary to get through all the items that have accumulated.

13. Adjournment: the call was adjourned at 1:15pm US Eastern Time.

Prepared and submitted by Shayna Knazik
Legal Bezalel Stern 1-23-23