

IHE For Radiation Oncology IHE-RO

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IHE RO Organization ASTRO sponsored and AAPM supported

- Task Force Co-Charis
 - Dick Fraass Ph.D FAAPM, FASTRO, FACR Cedars-Sinai
 John Buatti MD University of Iowa
- Planning Committee
 - Alf Sicochi Ph.D. West Virginia University
 - Mark Pepelea, Philips Healthcare
 - Bridget Koontz, Duke University Medical Center
- Steering Committee Various and Sundry MDs and PhD
- Technical Committee
 - Scott Hadley Ph.D. University of Michigan
 - Chris Pauer, Sun Nuclear

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Why is IHE-RO Important?

- ASTRO's 6-point patient protection plan
 - 5) Further developing our Integrating the Healthcare Enterprise Radiation Oncology (IHE-RO) connectivity compliance program to ensure that medical technologies from different manufacturers can safely transfer information to reduce the chance of a medical error.
- Promotes discussion and correction of protocols / standards for data communication to improve the reliability and safety of data exchange in radiation oncology
- Provides a mechanism for inter-manufacturer testing of radiation oncology products prior to delivery
 - Domain Pre-testing
 - Connectathon

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IHE RO alphabet soup

- BRTO Basic RadioTherapy Object
 Simulation, set iso/fields, calculated dose, delivery
- ARTI Advanced RT Integration
 3DCRT, IMRT, Dynamic Wedge, Arc, VMAT, ...
- MMRO MultiModality image registration for RO
 CT to CT, CT to MRI, Exchange of contours, Dose Display
- TDW Treatment Delivery Workflow
 - Exchange of Plan to/from Device and Treatment Management System

| Delivershy of Mich Igan Medical Scienti | Imaging Tec Melinda Tasch | |
|--|------------------------------|--|
| 7 Planning | Systems | |
| IMRT | | |
| SRS | | |
| Brachy | | |
| Irr'g Fie | elds | |
| Conf' A | rc | |
| Adaptiv | e Planning | |
| Img['] Re | egistration | |
| Multi' Ir | nage Support | |
| TMS In | tegration | |

| Photon algorithms | Ray-Tracing and Monte Carlo | Convolution Superposition |
|--|--|---|
| Electron algorithms | N/A | N/A |
| Proton algorithms | N/A | N/A |
| Dosimetric portal image calculation (Can the system calculate an expected dose distribution at the plane of an electronic portal imaging device?) | IN/A | N/A |
| Framework / architecture | Robetic | Ring gantry |
| BEAM DATA CONFISURATION | | |
| Electronic approval | Yes | N/A |
| Analysis tools | Yes | 16 |
| Physics table output | Yes | N/A |
| INTERFACES / INTEGRATION | | |
| DKOW RT objects supported | RTImage, RTSSet, RTDose | RTImage, RTSSet, RTDose |
| RTOG / ATC DICOM compliance | Yes | 16 |
| Information systems supported | Aria, Mosaiq | Aria, Mosaiq |
| Other features | Planning and delivery systems fully integrated, sharing a common database | Beam data comes pre-installed with the sy for TomoHelical and direct modes |



What are the Standards?

- DICOM (Digital Imaging and Communications in Medicine)
 - DICOM is a standard for handling, storing, printing, and transmitting information in <u>medical imaging</u>.
 - DICOM enables the integration of scanners, servers, workstations, printers, and network hardware from multiple manufacturers http://medical.nema.org
- HL7 (Health Level 7)
 - HL7 is an international community of healthcare subject matter experts and information scientists collaborating to create standards for the exchange, management and integration of electronic healthcare information.
 - HL7 promotes the use of such standards within and among healthcare organizations to increase the effectiveness and efficiency of healthcare delivery for the benefit of all.
 - http://www.HL7.org
- Parts from http://www.wikipedia.org

Real TC Example

- The abbreviation "SSD" stands for?
 - Source to SKIN distance?
 - Source to SURFACE distance?
- HDR source position refers to which of the following?

Tip of the Wire? -

Middle of Active Source? ~

Profile Life Cycle

- Idea submission from
 - IHE RO members PC, SC, TC
 - Draft Clinical use cases & Impact Statements
 - Ranked in terms of importance and prioritized
- TC investigates and determines
 - Available standard for implementation
 - Possible technical issues with profile

Profile Life Cycle

- TC Drafting Phase
 - Profile has champion from vendor to do major drafting
 - Drafting happens off line as well as at Face to Face meetings of TC
 - Possible to send "CP"s Change Proposals back to DICOM
- TC Final Draft
- Sent to IHE for Public Comment phase
- Trial Implementation
- Final, Available for Connectathon Testing
- · Deprecation when replaced

ARTI Clinical Impact Statement

"How will this get me home 20 minutes earlier" - Dick Fraass

Clinical Impact:

This profile describes the accepted way to export external beam plans delivered on a linac. Where there has been ambiguity in defining plan data at each point in the delivery, this profile defines one way to report It. For example, notorized wedge monitor units, externo field size and downnically are beams. The goal of this profile is to be able to intercommunicate. An individual reading this profile should be able to identify the required elements of such an export for a specific type of plan.

The profile also emands that the user can display the original plan content on the receiving system and thus allow the user to compare the original data to the receiving system's internal, working version of the plan. This can serve as an audity cold information doesn't match up after data transfer. This profile facilitates this by specifying the mandatory, minimally available data for comparison of plans. This allows the user to see the original plan contents to that it is readable not put in DCOM format.

RXRO "Prescription" Use Cases

- HIS/EMR Draft of MD Intent
 - Transfer to OIS
 - OIS updates Rx after simulation
 - Planning system pick up Rx from OIS
 - Plan is produced and updated Rx sent to OIS/HIS/EMR
- · Context Specific Displays of information
 - "Simple" display for Tx Delivery
 - "Full" information for planning and review

What happens after the Connectathon?

- Successful results (specific by IHE profile/actor) are published by the sponsors (www.line.net/competitions)
 - Found on ASTRO website
- Vendors self-certify, by publishing IHE Integration Statements: Precise and explicit public interoperability commitment fro a specific commercial product.
 - Found on vendor website or ask for copy with RFP

IHE Integration Statement

| IHE Integration Statement | | | | | | |
|--|--|-------------------------|----------------------|--|--|--|
| Vendor | Product Name | Version | Date (dd/mm/yyyy) | | | |
| Big Medical Buisness | RIS2003 | 3.4 | 15/10/2003 | | | |
| Integration Profiles Implemented | Actors Implemented | Optic | as Implemented | | | |
| Scheduled Workflow | Department System Scheduler/Order Filler | None | | | | |
| Scheduled Workflow | Performed Procedure Step Manager | None | | | | |
| Patient Information Reconciliation | Department System Schechuler/Order Filler | None | | | | |
| Intern | et address for vendor's IHE inform | mation : | | | | |
| http://www.big-buisness.com | | | | | | |
| Links to Standar | ds Conformance Statements for th | te implemes | station | | | |
| Health Level 7 | http://www.big-buisness.com/HL7 | | | | | |
| Dicom | http://www.big-buisness.com/DIO | OM | | | | |
| I | inks to general information on 11 | IE | | | | |
| In North America: http://www.rsna.org/IHE | In Europe: http://www.ilic-curope.org | In Japan: http://www | jira-net.or.jpfihe-j | | | |

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| Distancing of Medical | Mich Igan | ΗE | RO Wo | ebsi | ite | | | | | |
|--------------------------|--|-------------|--|---------|--|----------------|---|--|---|---------------|
| | http://ww | /w.ih | <u>e-ro.org/</u> | | | | | | | |
| | 1 Name | ID | State | Started | Document | Doe Version | Clinical Impact | Profile Proposal | Profile Overview | Main |
| | Advanced RT Objects Interoperability | ARTI | Final Text | 2004 | ARTI Supplement v1.6 g ARTI Spreadsheet v1.4 g | 1.6 | ARTI Clinical Impact Statement S | ARTI Proposal | Advanced RT Objects Interoperability int | Bruo |
| | Basic RT Objects Interoperability | BRTO | Published in Technical Framework | 2004 | Volume 1 19, Volume 2 3 Im CP for High- resolution contours(draft) | 1.8 | BRTO Clinical Impact Statement d | Normal Treatment Planning-Simple in | Basic_Radiation_Therapy_Objects in | Bruo |
| | Basic RT Objects Interoperability II | BRTO- II | In Public Comment, planned review in June 2016 | 2015 | toi BRITO-II Rev 1.1 | 1.1 | Em BRTO-II Clinical Impact Statement | Harring Mal | (PFix Mol) | Sven Siekt |
| | Consistent Dose for External Beam | CDEB | Voted Pulbic Comment May 2016 | 2014 | CDEB 1.8 | 1.8 | (Fix Met) | In CFix Mul | (PFix Met) | Chris |
| Hadlation | Consistent | CPRO | Draft | 2013 | (PEix Mel) | | CPRO | In Fix Met | (PEix Mel) | user |

IHE Website

| | tegrating | | For | Developers For Use | |
|---------------------|---|-------------------|--------------------------------|-----------------------------|------------------|
| | le Healthcare | | | | - |
| | nerprose | | | | Mamber Louis |
| bout IHE | Participate Resources | Testing | HE Domains | HE Worldwide | News |
| E Domains | IHE Radiation Oncolo | gy | | TEOHIC | AL PRANEWORK |
| | HE Radiation Oncology addresses | information she | ering, workflow, and patient | t care in Pute | IC COMMENT |
| roongy | redutor proology it is sponsored t | by the American | Society for Radiation On | sology (ASTRO). | |
| ental | Reparer Unchargy reprinter H | Comework. | | | |
| | IHE Radiation Oncology (| Profiles | | | |
| ye Care | [NTPL-6] Normal Treatment Pic | anning-Simple I | ilustrates flow of treatment | planning data from CT to Do | se Review for |
| | basic treatments | | | | |
| infrastructure | [MMR-R0] Multimodality Regist | tradien for Radia | ation Oncology integrates P | ET and MRI data into the co | touring and dose |
| athelium and Labor | ITEMET OT Transmit Manfred | between the state | - Includes with restinging the | the standards when we do | 27 |
| ledone | In Station Occupies With | i i ingrani (an | a seeder of man receiver of | and services could note | |
| | in a restaure crossing rest | | | | |
| adient Care Coordin | ation Committee Co-Chains | | | | |
| | Planning Committee: Bridget Koor | sz, Adam Eanwi | cker, Dolin Field | | |
| aners usels Devices | Technical Committee: Scott Harlies | Chris Parer | | | |
| | | | | | |

| ASTRO Website | |
|---|--|
| https://www.astro.org/IHE-RO.aspx | |
| Products that have passed the IHE-RO testing process The following products have passed integration tests.* Access either an "Integration Statement" or a vendor developed statement that you can use for your RPs below. | |
| Accuray TemoHD (2010) | |
| BrainLab #Elements 15 (2015) #WetT Date 4.5 (2015) #WetT Date 4.5 (2015) #WetT Date 4.5 (2016) #WetT Times 4.5 (2016) | |
| ELECTA Model Consider MC (2008) Model Consider MC (2008) Model Consider MC (2008) | |
