DICOM Correction Proposal

STATUS	Letter Ballot
Date of Last Update	2016/01/18
Person Assigned	Harry Solomon
Submitter Name	Harry Solomon
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Correction Number CP-1533
Log Summary: Clean up Composite IEs descriptions
Name of Standard PS3.3
Rationale for Correction: The IE elements in Figure A.1-1 DICOM Composite Instance IOD Information Model are inconsistent with the IEs described in Section A.1.2, and with the IEs used in the IODs. The following IEs are no longer in the model, but definitions are provided: Overlay, Modality LUT, VOI LUT; these are now considered elements within Image IEs and Presentation State IEs. The following IE is in the model, but definition is not provided: (Spatial) Fiducials The following IEs are not in the model, but are used in composite IODs: Dose, Structure Set, Treatment Record, Stereometric Relationship
Correction Wording:

A.1.2 IOD Entity-Relationship Model

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Figure A.1-1 is the DICOM Composite Instance IOD Information Model. It applies to all of the Composite Instance IODs defined in Annex A. However, a subset of this model may be specified by each individual Composite Instance IOD to accurately define the context for specific composite instance exchange**; in particular, an IOD will specify a single IE at the level below the Series IE**.

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Change "Fiducials" in figure A.1-1 to "Spatial Fiducials"

Add elements "Dose", "Structure Set", "Treatment Record", "Stereometric Relationship"

Note that "Tractography Results" was added by Sup181.

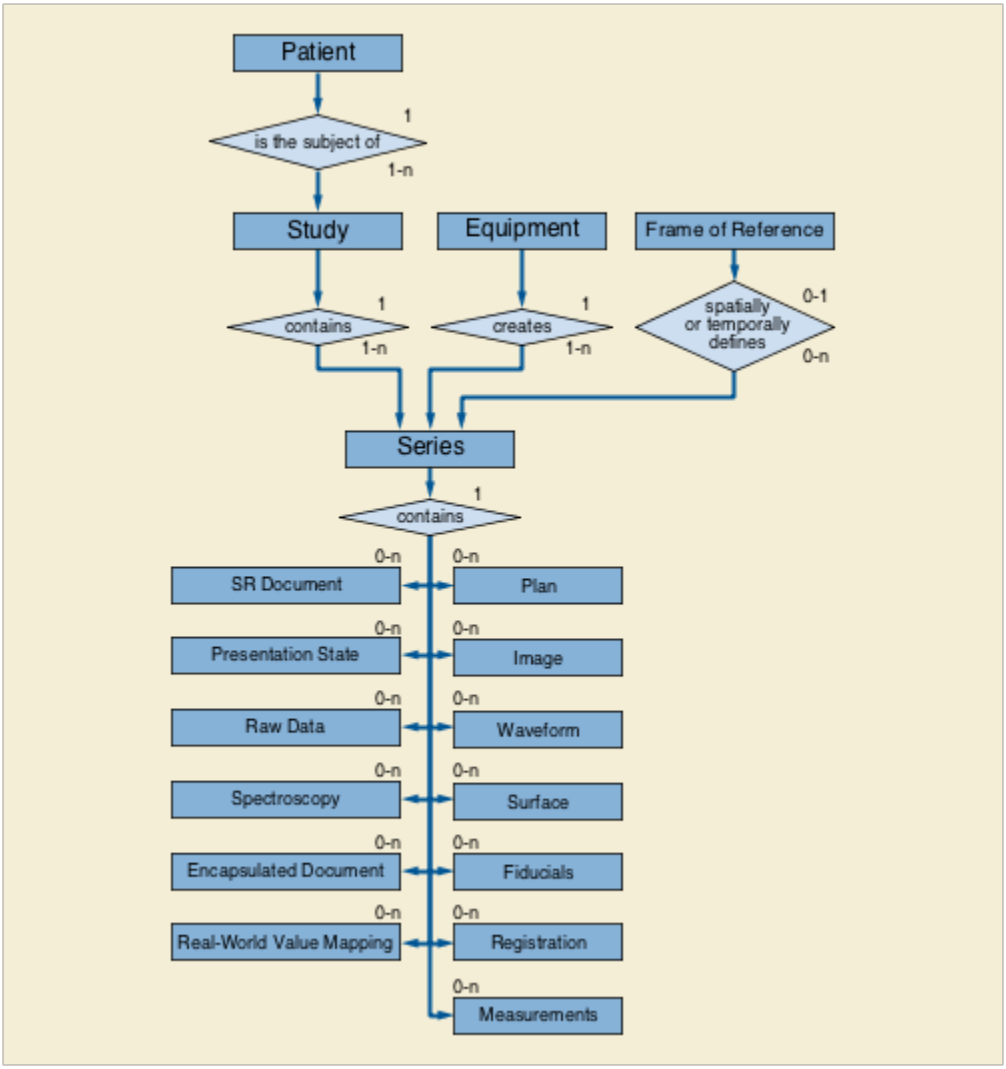

Figure A.1-1. DICOM Composite Instance IOD Information Model

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A.1.2.6 Image IE

The Image IE defines the Attributes that describe the pixel data of an image. The pixel data may be generated as a direct result of patient scanning (termed an Original Image) or the pixel data may be

derived from the pixel data of one or more other images (termed a Derived Image). An image is defined by its image plane, pixel data characteristics, gray scale and/or color mapping characteristics, ~~**overlay planes**~~ and modality specific characteristics (acquisition parameters and image creation information).

An image is related to a single series within a single study.

The pixel data within an Image IE may be represented as a single frame of pixels or as multiple frames of pixel data. The frames of a Multi-frame image (a cine run or the slices of a volume) are sequentially ordered and share a number of common properties. A few Attributes may vary between frames (e.g., Time, Angular Displacement, Slice Increment). All common Image IE Attributes refer to the first frame of a multiple frame image.

Overlay**,** ~~**and**~~ **Modality and Value of Interest** Lookup Table**, and Real World Value Mapping** data may be included within an Image IE only if this information is directly associated with the image.

A.1.2.6.1 Overlay Data

Overlay data represents graphics or text in a bit-map format, and is used to indicate such items as region of interest, reference marks and annotations.

A.1.2.6.2 Modality LUT Data

Modality LUT data describes the transformation of manufacturer dependent pixel values into pixel values that are manufacturer independent (e.g., Hounsfield units for CT, Optical Density for film digitizers, etc.). The transformation may be linear, described by Rescale Slope and Rescale Intercept, or non-linear, described by a Lookup Table (LUT).

A.1.2.6.3 Value of Interest LUT Data

The Value of Interest (VOI) LUT data describes the transformation of the modality pixel values into pixel values that are meaningful for print, display, etc. This transformation is applied after any Modality LUT. The transformation may be linear, described by Window Center and Window Width, or non-linear, described by a Lookup Table. A non-linear interpretation of Window Center and Window Width may be defined by VOI LUT Function.

A.1.2.6.4 Real World Value Mapping Data

The Real World Value Mapping data describes the transformation of the image pixel values into real world values in defined units. There may be multiple transformations, each scoped by a range of input pixel values. Each transformation may be linear, described by Slope and Intercept, or non-linear, described by a Lookup Table.

A.1.2.7 Overlay IE

Retired. See PS3.3-2016.

Note:

> **Overlays were previously modeled as independent Information Entities; in the current model they are considered attributes within the Image IE or Presentation State IE. See Section A.1.2.6.1.**

~~The Overlay IE defines the Attributes that describe an independent set of Overlay Planes. The Overlay IE may represent in a bit-map format, graphics or text and is used to indicate such items as region of interest, reference marks and annotations. Sufficient information shall be available to allow an overlay to be presented at a display station superimposed on a particular image with which it is associated. An Overlay IE shall be related to only one Series IE.~~

~~An Overlay Plane may be represented as a single frame (when associated with a single frame image) or as multiple frames of overlay planes (when associated with a Multi-frame image).~~

A.1.2.8 Curve IE

Retired. See PS3.3-2004.

A.1.2.9 Modality LUT IE

Retired. See PS3.3-2016.

> **Note:**
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> **Modality LUTs were previously modeled as independent Information Entities; in the current model they are considered attributes within the Image IE or Presentation State IE. See Section A.1.2.6.2.**

~~The Modality LUT IE defines the Attributes that describe the transformation of manufacturer dependent pixel values into pixel values that are manufacturer independent (e.g., Hounsfield units for CT, Optical Density for film digitizers, etc.). The Modality LUT may be contained within an image, or a presentation state that references an image. When the transformation is linear, the Modality LUT is described by Rescale Slope (0028,1053) and Rescale Intercept (0028,1052). When the transformation is non-linear, the Modality LUT is described by Modality LUT Sequence (0028,3000).~~

A.1.2.10 VOI LUT IE

Retired. See PS3.3-2016.

> **Note:**
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> **VOI LUTs were previously modeled as independent Information Entities; in the current model they are considered attributes within the Image IE or Presentation State IE. See Section A.1.2.6.3.**

~~The VOI LUT IE defines the Attributes that describe the transformation of the modality pixel values into pixel values that are meaningful for print, display, etc. This transformation is applied after any Modality LUT. The VOI LUT may be contained within an image, or a presentation state that references an image. When the transformation is linear, the VOI LUT is described by Window Center (0028,1050) and Window Width (0028,1051). When the transformation is non-linear, the VOI LUT is described by VOI LUT Sequence (0028,3010). A non-linear interpretation of Window Center (0028,1050) and Window Width (0028,1051) may be defined by VOI LUT Function (0028,1056).~~

A.1.2.11 Presentation State IE

The Presentation State IE defines how a referenced image (or images) will be presented (e.g., displayed) in a device independent grayscale space (i.e., in P-Values) or color space (i.e., in PCS-values), and what graphical annotations and spatial and grayscale contrast transformations will be applied to the referenced image pixel data.

Overlay, Modality LUT, and VOI LUT data (see Sections A.1.2.6.1, A.1.2.6.2, and A.1.2.6.3) may be included within a Presentation State IE if this information is to be applied to the referenced image(s).

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A.1.2.17 Real World Value Mapping IE

The Real World Value Mapping IE defines the attributes that describe the mapping of stored pixel data to Real World values. **(See Section A.1.2.6.4)**

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A.1.2.x1 Spatial Fiducials IE

The Spatial Fiducials IE identifies one or more geometric locations or shapes within a frame of reference or image pixel/voxel space that may be correlated with similar locations or shapes within different frames of reference or image pixel/voxel spaces.

A.1.2.x2 Dose IE

The Dose IE describes dose distributions calculated by radiotherapy treatment planning systems. These distributions may be represented as 2D or 3D grids, as isodose curves, or as named or unnamed dose points scattered throughout a volume.

A.1.2.x3 Structure Set IE

The Structure Set IE describes Regions of Interest (ROI) within a referenced 2D (image) or 3D (volumetric) space. These ROIs may be represented as geometric contours.

A.1.2.x4 Treatment Record IE

The Treatment Record IE describes treatments, particularly radiotherapy, for a Patient.

A.1.2.x5 Stereometric Relationship IE

The Stereometric Relationship IE defines how referenced images are related as stereometric pairs.