

DICOM Correction Proposal

STATUS	Final Text
Date of Last Update	2013/02/07
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Correction Number	CP-1236
Log Summary: Directional flow velocity issues with Enhanced Ultrasound Volume IOD	
Name of Standard PS 3.3 - 2011	
<p>Rationale for Correction:</p> <p>Information that is valuable in the correct interpretation of directional flow volume data is missing in the existing Enhanced US Volume IOD defined in Supplement 43 "Storage of 3D Ultrasound Image" approved for Final Text in April, 2009. The issues to be corrected are:</p> <ol style="list-style-type: none"> 1) There is no direct means for specifying the ultrasound data type "Directional Flow Power". There is a Data Type (0018,9808) Defined Term FLOW_POWER but none specifically for directional flow power as opposed to unidirectional flow power. 2) For Data Type (0018,9808) of TISSUE_VELOCITY, FLOW_VELOCITY, or directional FLOW_POWER, there is no direct means for specifying the Doppler baseline (zero point) for baseline-shifted data. <p>There are some means by which these factors might be inferred, but the attributes in question are optional. Further, significant processing would be required to extract this inferred information even if the optional attributes were present :</p> <ol style="list-style-type: none"> a) Real World Value Mapping Macro (PS3.3 C.7.6.16.2.11, "U" (User option) for Enhanced US Volume IOD). Data Type (0018,9808) of FLOW_POWER together with the presence of signed and unsigned real world values would indicate directional flow power. b) Colorization of FLOW_POWER data in a bidirectional palette color lookup table in the Enhanced Blending and Display Pipeline (PS3.3 C.7.6.23) could be used to infer directional flow power, but this can only be determined by human interpretation of the color map with a-priori knowledge of what different hues mean. Further, the Enhanced Blending and Display Pipeline is a default presentation state attribute and is not a characteristic of the data itself. <p>This information should be specified directly in the Enhanced US Volume IOD.</p>	
Correction Wording:	

PS 3.3 Add attribute to Image Data Type Macro

C.7.6.16.2.24 Image Data Type Macro

Table C.7.6.16.2.24-1 specifies the attributes of the Image Data Type Functional Group macro.

**Table C.7.6.16.2.24-1
IMAGE DATA TYPE MACRO**

Attribute Name	Tag	Type	Attribute Description
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Attribute Name	Tag	Type	Attribute Description
Image Data Type Sequence	(0018,9807)	1	Identifies the data type characteristics of this frame. Only a single Item shall be included in this sequence.
>Data Type	(0018,9808)	1	Identification of the data type of a frame. See C.7.6.16.2.24.1 for Defined Terms and further explanation.
>Aliased Data Type	(0018,980B)	1	Indicates whether this data type is "aliased". Enumerated Values: YES = data are aliased values NO = data are not aliased values See C.7.6.16.2.24.2 for further explanation.
> Zero Velocity Pixel Value	(0018,9810)	1C	Data value at which velocity is zero. See C.7.6.16.24.x for further information. Required if Data Type (0018,9808) is TISSUE VELOCITY, FLOW VELOCITY or DIRECTION POWER. May be present otherwise.

PS 3.3 Add new defined term to Image Data Type Defined Terms and add new section with description

C.7.6.16.2.24.1 Data Type

Data Type (0018,9808) indicates the data type of an image frame. Table C.7.6.16.2.24.1-1 lists Defined Terms for this value.

**Table C.7.6.16.2.24.1-1
DATA TYPE DEFINED TERMS**

Defined Term Name	Defined Term Description
TISSUE_INTENSITY	Tissue intensity typically displayed as grayscale (e.g. B-mode)
TISSUE_VELOCITY	Velocity (Doppler shifts) of tissue
FLOW_VELOCITY	Velocity (Doppler shifts) of blood flow
FLOW_POWER	Power contained in the Doppler signal
<u>DIRECTION_POWER</u>	<u>Directional power contained in the Doppler signal</u>
FLOW_VARIANCE	Statistical variance of blood velocity relative to mean
ELASTICITY	Scalar value related to the elastic properties of the tissue
PERFUSION	Scalar value related to the volume of blood perfusing into tissue
SOUND_SPEED	Speed of sound in tissue
ATTENUATION	Reduction in strength of ultrasound signal as the wave traverses through the medium

C.7.6.16.2.24.x Zero Velocity Pixel Value

Certain data types represent velocity that is directional by nature. For these data types, there shall be one particular pixel data value that corresponds to zero velocity. Zero Velocity Pixel Value (0018,9810) indicates the pixel data value corresponding to zero velocity.

The VR of Zero Velocity Pixel Value (0018,9810) corresponds to the value of Pixel Representation (0028,0103): If Pixel Representation (0028,0103) is 0000H (unsigned integer), the VR of Zero Velocity Pixel Value (0018,9810) shall be US; otherwise the VR of Zero Velocity Pixel Value (0018,9810) shall be SS.

Add new attribute to PS 3.6 Registry

Tag	Name	Keyword	VR	VM
...				
<u>(0018,9810)</u>	<u>Zero Velocity Pixel Value</u>	<u>ZeroVelocityPixelValue</u>	<u>US or SS</u>	<u>1</u>
...				