



CARL ZEISS MEDITEC

## DICOM Conformance Statement

-- Offline media storage support --

**VISUCAM<sup>PRO NM</sup> , VISUCAM<sup>NM FA</sup>**  
**and VISUCAM<sup>NM FA Opt AF</sup>**

**SW - Version 4.2**

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**December, 2007**



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Formatiert: Nummerierung und Aufzählungszeichen

# 1 Introduction

## 1.1 Purpose

This DICOM Conformance Statement was written according to part PS 3.2 of the DICOM Standard.

The intended audience for this Conformance Statement is hospital technical staff, system integrators and software engineers. The reader is assumed to have good understanding of the DICOM standard.

The Conformance Statement of one implementation can be compared with the Conformance Statement of another implementation to determine which capabilities are commonly supported.

DICOM does not, by itself, guarantee interoperability. Furthermore, the identification of common capabilities by comparing DICOM Conformance Statements is also not sufficient to guarantee connectivity between two devices.

A DICOM Conformance Statement cannot replace validation and cross-vendor testing with other devices. Validation and cross-vendor testing are still required to ensure that both devices are performing as intended.

## 1.2 Scope

The application described in this document is the VISUCAM NM Software from Carl Zeiss Meditec AG, Germany. This software acts as DICOM File Creator and DICOM File Reader. Creation/Reading of File-Sets and DICOMDIR is not supported.

## 1.3 Definitions

Term	Definition
ACR-NEMA	American College of Radiology – National Electrical Manufacturers Association.
AE	Application Entity
DCO	DICOM Composite Object. A DICOM object such as an image, overlay, lookup-table, waveform, presentation state or radiotherapy plan which can be stored using the Storage Service Class.
DICOM File	A DICOM File is a File with a content formatted according to the requirements of this Part of the DICOM Standard. In particular such files shall contain, the File Meta Information and a properly formatted Data Set
DIMSE	DICOM Message Service Element
DIMSE-C	DICOM Message Service Element –Composite
File-Set	A File-set is a collection of DICOM Files (and possibly non-DICOM Files) that share a common naming space within which File IDs are unique.
FSC	File Set Creator. An Application Entity that creates the DICOMDIR File (see section 8.6) and zero or more DICOM Files.
FSR	File Set Reader. An Application Entity that accesses one or more files in a File-set.
IOD	Information Object Definition
PACS	Picture Archiving and Communication System

Term	Definition
SC	Service Class
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair
UID	Unique Identifier
VR	Value Representation
VISUPAC	Fundus Imaging System by CZMS, Pirmasens

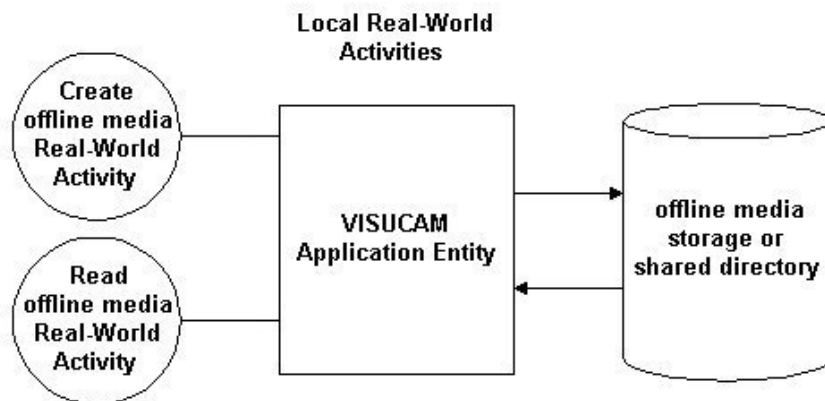
#### 1.4 Referenced documents

Document Number	Title	Revision
	DICOM, PS 3.1-3.17-2004, National Electrical Manufacturers Association, 1300 N. 17 <sup>th</sup> Street Rosslyn, Virginia 22209, USA.	2004

## 2 Implementation Model

The VISUCAM DICOM services are implemented as a single Application Entity which acts as Image Creator and provides the possibility of writing and reading DICOM files. It provides an interface to CD-R/RW, other mass storage devices and network connected file systems. The VISUCAM software includes a database for configuring and managing operating parameters.

### 2.1 Application Data Flow Diagram



## 2.2 Functional Definition of Application Entities

The VISUCAM Application Entity is designed to create DICOM images and write them to (shared) hard disk or an offline medium. It is capable of:

- Creating a new File onto an external medium (e.g. CD-RW/DVD-RW, memory stick)
- Writing a new File to a network file system
- Reading a new File from a medium or a network file system

## 2.3 Sequencing of Real World Activities

The order of execution of the described Real-World Activities is not relevant. Each described Real-World Activity is executed independently from the other one.

## 3 Application Entity Specifications

The VISUCAM software acts as a single Application Entity (AE).

Application Profiles Supported	Real World Activity	Role	SC option
N/A	Export to local export media	File Creator	N/A
N/A	Read from local media	File Reader	N/A

### 3.1 File Meta Information for Application Entity

The Source AE-Title is "VISUCAM PRO NM" or "VISUCAM NM FA" depending on the base instrument.

### 3.2 Implementation Identifying Information

Implementation Class UID:	1.2.276.0.75.2.1.20.1.4
Implementation Version Name:	V_4_x

### 3.3 Real-World Activities for this Application Entity

#### 3.3.1 Real-World Activity: Export to local export media

The VISUCAM application acts as file creator when requested to copy SOP Instances from the local storage to local file export medium. Further on VISUCAM can write DICOM-Files to network directories.

#### 3.3.2 Real-World Activity: Reading from local media

The VISUCAM application acts as File Reader when requested to copy SOP Instances from the local medium to the local storage. Further on, VISUCAM can read DICOM-Files from network directories.

Information Object Definitions	SOP Class UID	Transfer Syntax and UID

VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Implicit VR Little Endian Uncompressed 1.2.840.10008.1.2 JPEG Baseline compressed 1.2.840.10008.1.2.4.50
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## 4 Extensions, Specializations and Privatizations of SOP Classes

### 4.1 Acquisition Context Module

For exact information in fundus images, a few additional parameters, not defined in the VL-IOD are needed. These parameters are stored in a private Acquisition Context Sequence as defined below.

The VISUCAM application utilizes a special Coding Scheme to encode the Acquisition Context Module in two different versions:

Coding Scheme "99HIKO":

Coding Scheme Designator (0008,0102): 99HIKO  
Coding Scheme Version (0008,0103): VP4.0  
Coding Scheme Version (0008,0103): VP3.2

The coding scheme version to use is defined by configuration in the VISUCAM application. As default coding scheme version VP4.0 is used. The coding scheme version VP3.2 is used for backward compatibility reasons.

#### 4.1.1 Acquisition Context Sequence Coding Schemes

Coding Scheme Version	Coding Type	Code Names	Code Values / Range	Code Meaning / Comments
99HIKO, VP4.0	Concept Code	Sensor		
		Protocol Name	"STANDARD_POSITION" "CENTER_POSITION" "OPTIC_DISK" "NO_PROTOCOL" "CZM_2_FIELDS" "CZM_3_FIELDS" "CZM_5_FIELDS" "CZM_7_FIELDS" "ETDRS_7_FIELDS"	The name of the multiple field fixation protocol the image belongs to
		Stereo	"Stereo"	Indicates if image is part of a stereopair. Only present in stereo images
		Stereo laterality	"Left" "Right"	Only present in stereo images
		Stereo exam SOP instance UID		The IUID of the stereo pair, the given image belongs to. Only present in stereo images

Coding Scheme Version	Coding Type	Code Names	Code Values / Range	Code Meaning / Comments
	Numeric Value with Unit	Angle		
		Flash		
		Gamma		
		Sensor Gain		
		Max number of fixation points		The number of fixation positions of a multiple field fixation protocol
		Fixation Point		The fixation position index
		Fixation point X		The fixation point x - coordinate
		Fixation point Y		The fixation point y - coordinate
		Fixation point angle X		Not implemented
		Fixation point angle Y		Not implemented
		Focus aid	1 : On 0 : Off	
		Focus position		
		Eye section	0 : Anterior 1 : Posterior	
		Stereo offset X		Relative offset X of right stereo image to left in image pixels
		Stereo offset Y		Relative offset X of right stereo image to left in image pixels
<i>Description .. see above</i>				
99HIKO, VP3.2	Text Value	Sensor		
		Protocol Name		
		Stereo		
		Stereo laterality		
		Stereo exam SOP instance UID		
	Numeric Value	Angle		
		Flash		
		Gamma		
		Sensor Gain		
		Fixation point		
		Max number of fixation points		
		Fixation point X		
		Fixation point Y		
		Fixation point angle X		
		Fixation point angle Y		
		Focus aid		
		Focus position		
		Eye section		

Coding Scheme Version	Coding Type	Code Names	Code Values / Range	Code Meaning / Comments
		Pixel Width		
		Pixel Height		
		Stereo offset X		
		Stereo offset Y		

The coding scheme stored depends on configuration (see Chap. 5)

## 4.2 Further Specializations

VISUCAM Software uses value multiplicity 4 for *ImageType (0008, 0008)*.  
The third value is not used and is intended to be empty:

ORIGINAL/DERIVED | PRIMARY/SECONDARY | | COLOR/GREEN/RED/BLUE/FAG/ICG/AF/MONTAGE

## 5 Configuration

Configuration should only be performed by staff with administrative training.

### 5.1 Acquisition Context Settings

For switching between Acquisition Context Coding scheme versions, when creating a DICOM File, the following VISUCAM MainU.ini file entry is used:

```
[Import/Export]
VISUPAC=0/1
```

Meaning:

VISUPAC DICOM Compatibility

0 ... VISUPAC 3.5 and older -> Coding Scheme Version VP3.2

1 ... from VISUPAC 4.0 -> Coding Scheme Version VP4.0

Default Value: 1

### 5.2 Transfer Syntax settings:

This setting affects DICOM file creation.

```
[Import/Export]
DICOMTransferSyntax =0/1
```

Meaning:

0 ... Little Endian uncompressed -> Transfer Syntax: 1.2.840.10008.1.2

1 ... JPEG Baseline compressed -> Transfer Syntax: 1.2.840.10008.1.2.4.50

Default Value: 0

## 6 Support of Extended Character Sets

The extended character sets listed the following table supported:

ISO-IR 100	Latin Alphabet Supplementary Set No. 1 (ISO 8859-1)

Note, the DICOM default character set (ISO-IR 6) is a subset of ISO-IR 100.

## 7 Annexes

### 7.1 VL Photographic Image IOD

Module	Attribute	Tag	Type	Description	
PATIENT	Patient Name	(0010,0010)	2		
	Patient ID	(0010,0020)	2		
	Patient Sex	(0010,0040)	2	User selected: M, F or O	
	Patient Birth Date	(0010,0030)	2		
	Other Patient Ids	(0010,1000)	3		
	Patient Comment	(0010,4000)	3		
GENERAL STUDY	Study Instance UID	(0020,000D)	1		
	Study Date	(0008,0020)	2		
	Referring Physician's Name	(0008,0090)	2		
	Accession Number	(0008,0050)	2		
	Study Description	(0008,1030)	3		
	GENERAL SERIES	Modality	(0008,0060)	1	XC for newly captured images SC for modified or imported images
Series Instance UID		(0020,000E)	1		
Series Date		(0008,0021)	3		
Series Time		(0008,0031)	3		
Operators Name		(0008,1070)	3		
Performing Physician's Name		(0008,1050)	3		
Body Part examined		(0020,0015)	3	HEAD	
Laterality		(0020,0060)	2C	R or L or U	
GENERAL EQUIPMENT		Manufacturer	(0008,0070)	2	Carl Zeiss Meditec AG
		Institution Name	(0008,0080)	3	
	Institution Address	(0008,0081)	3		
	Station Name	(0008,1010)	3		
	Institutional Department Name	(0008,1040)	3		
	Manufacturer Model Name	(0008,1090)	3		
	Device Serial Number	(0018,1000)	3		
	Software Version	(0018,1020)	3		
	GENERAL IMAGE	Instance Number	(0020,0013)	2	
		Content Date	(0008,0023)	2C	
Image Type		(0008,0008)	3	4 Items: 1. ORIGINAL DERIVED 2. PRIMARY 3. -empty- 4. FAG COLOR RED BLUE GREEN AF ICG MONTAGE	
Acquisition Date		(0008,0022)	3		
Acquisition Time		(0008,0032)	3		
Content Time		(0008,0033)	2C		
Image Comments		(0020,4000)	3		
IMAGE PIXELS		Samples per Pixel	(0028,0002)	1	3 for color images, 1 for monochrome images
		Photometric Interpretation	(0028,0004)	1	RGB for color images, MONOCHROME 2 for monochrome images
		Planar Configuration	(0028,0006)	1C	Necessary for color images, then it has value 0 (for color-by-pixel).
	Rows	(0028,0010)	1	Number of rows.	
	Columns	(0028,0011)	1	Number of columns	
	Bits Allocated	(0028,0100)	1	8	
	Bits Stored	(0028,0101)	1	8	
	High Bit	(0028,0102)	1	7	
	Pixel Representation	(0028,0103)	1	0	
	Pixel Data	(7FE0,0010)	1		
SOP COMMON MODULE	SOP Class UID	(0008,0016)	1	1.2.840.10008.5.1.4.1.1.77.1.4	
	SOP Instance UID	(0008,0018)	1		
Additional Tags	Pixel Spacing	(0028,0030)	3	Only available if using acquisition context VP4.0	
	Acquisition Context Sequence	(0040,0555)	3		