



Penrad Technologies, Inc.

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DICOM Conformance Statement for PenScan

10580 Wayzata Blvd., Ste. 200  
Minnetonka, MN 55305  
[www.penrad.com](http://www.penrad.com)

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# 1 Introduction

## 1.1 Scope and Field of Application

## 1.2 Acronyms

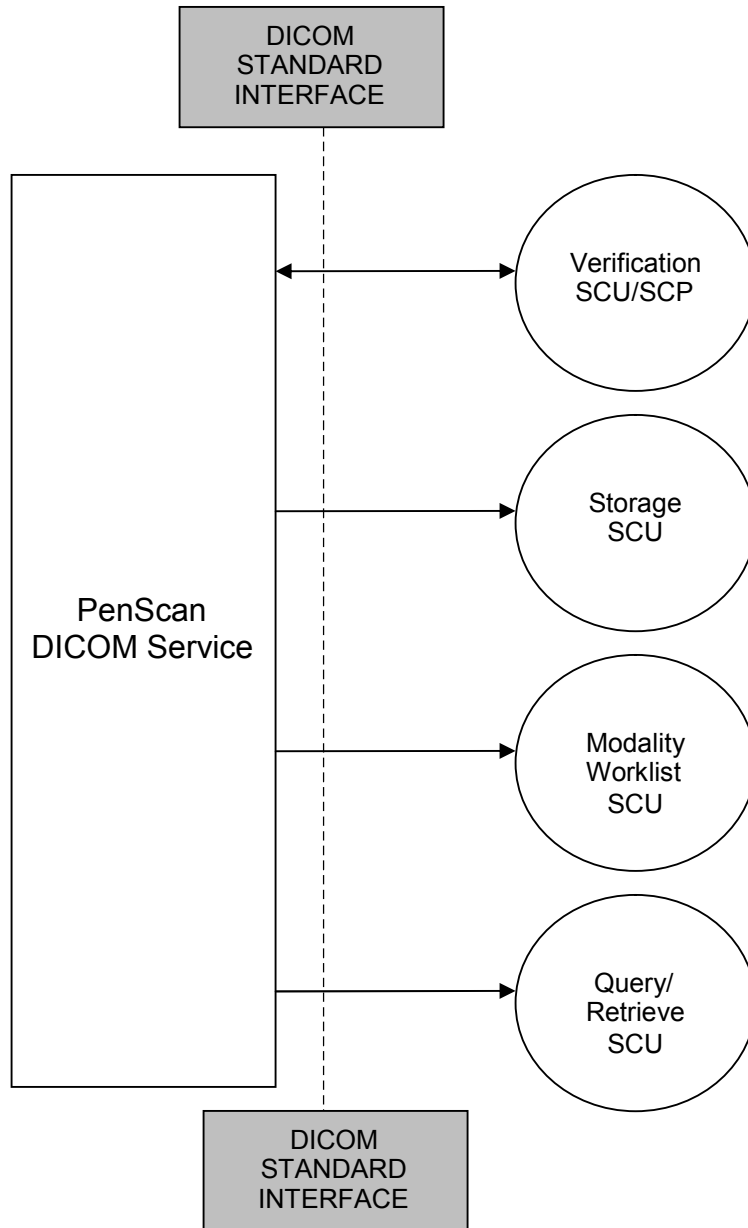
The following acronyms and abbreviations are used in this document.

<b>AE</b>	Application Entity
<b>ACR</b>	American College of Radiology
<b>ANSI</b>	American National Standards Institute
<b>DICOM</b>	Digital Imaging and Communications in Medicine
<b>GUI</b>	Graphical User Interface
<b>HIS</b>	Hospital Information System
<b>IOD</b>	Information Object Definition
<b>NEMA</b>	National Electrical Manufacturers Association
<b>PACS</b>	Picture Archiving and Communications System
<b>PDU</b>	Protocol Data Unit
<b>RIS</b>	Radiological Information System
<b>SCP</b>	Service Class Provider
<b>SCU</b>	Service Class User
<b>SOP</b>	Service Object Pair
<b>TCP/IP</b>	Transmission Control Protocol/Internet Protocol
<b>UID</b>	Unique Identifier
<b>VR</b>	Value Representation

Furthermore, all symbols, abbreviations, and definitions used herein are described in the Digital Imaging and Communications in Medicine (DICOM) standard, parts 1 through 13 (NEMA PS3.1-13).

## 2 Implementation Model

### 2.1 Application Data Flow Diagram



## 2.2 Functional Definitions of Application Entities

The PenScan system supports Verification Services as a SCP. The DICOM Service Class User may request a C-ECHO operation to verify communications with the SCP.

The PenScan system acts as an SCU for Verification, Storage, Modality Worklist, and Query/Retrieve SOP classes.

## 2.3 Sequencing of Real-World Activities

No sequencing of Real World activities is required. An association is opened at the beginning of each activity and the association is ended when the activity is completed.

# 3 AE Specifications

## 3.1 AE Specifications for PenScan

The PenScan system Application Entity provides Standard Conformance to the following DICOM v3.0 SOP Class as a SCP:

SOP Classes as SCP	
SOP Class UID	SOP Class Name
Verification	
1.2.840.10008.1.1	Verification

The PenScan system Application Entity provides Standard Conformance to the following DICOM v3.0 SOP Class as a SCU:

SOP Classes as SCU	
SOP Class UID	SOP Class Name
Verification	
1.2.840.10008.1.1	Verification
Storage	
1.2.840.10008.5.1.4.1.1.1.2	Digital Mammography X-Ray – For Presentation
1.2.840.10008.5.1.4.1.1.1.2.1	Digital Mammography X-Ray – For Processing
Modality Worklist Management	
1.2.840.10008.5.1.4.31	Modality Worklist Information Model
Query	
1.2.840.10008.5.1.4.1.2.1.1	Patient Root Query

### 3.1.1 Association Establishment Policies

#### 3.1.1.1 General

Application Context Name	1.2.840.10008.3.1.1.1
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Maximum PDU size offered	Unlimited
Maximum PDU size accepted	Unlimited

#### 3.1.1.2 Number of Associations

Not configurable

#### 3.1.1.3 Implementation Identifying Information

Implementation UID	TBD
Implementation Version Name	PenScan

### 3.1.2 Association Initiation Policy

#### 3.1.2.1 Send Images to a Remote System

##### 3.1.2.1.1 Associated Real World Activity

The PenScan system can be configured to send images to any number of remote systems. PenScan receives a digitized study. The user will verify the images received and push them to the remote system(s) configured.

##### 3.1.2.1.2 Accepted Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Digital Mammography X-Ray - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Digital Mammography X-Ray - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

**3.1.2.1.3 SOP Specific Conformance for SOP Class Storage**

<b>MG Storage</b>		
<b>Module</b>	<b>Description</b>	<b>Tag</b>
Patient	Patient's Name	(0010,0010)
	Patient ID	(0010,0020)
	Patient Birth Date	(0010,0030)
	Patient Sex	(0010,0040)
General Study	Study Instance UID	(0020,000D)
	Study Date	(0008,0020)
	Study Time	(0008,0030)
	Referring Physician's Name	(0008,0090)
	Study ID	(0020,0010)
	Accession Number	(0008,0050)
	Study Description	(0008,1030)
General Series	Modality	(0008,0060)
	Series Instance UID	(0020,000E)
	Series Number	(0020,0011)
DX Series	Presentation Intent Type	(0008,0068)
General Equipment	Manufacturer	(0008,0070)
	Institution Name	(0008,0080)
	Institution Address	(0008,0081)
	Station Name	(0008,1010)
	Institutional Department Name	(0008,1040)
	Manufacturer's Model Name	(0008,1090)
	Device Serial Number	(0018,1000)
	Software Versions	(0018,1020)
	General Image	Instance Number
Patient Orientation		(0020,0020)
Content Date		(0008,0023)
Content Time		(0008,0033)
Image Type		(0008,0008)
Presentation LUT Shape		(2050,0020)
Image Pixel	Samples per Pixel	(0028,0002)
	Photometric Interpretation	(0028,0004)
	Rows	(0028,0010)
	Columns	(0028,0011)
	Bits Allocated	(0028,0100)
	Bits Stored	(0028,0101)
	High Bit	(0028,0102)
	Pixel Representation	(0028,0103)
	Pixel Data	(7FE0,0010)
	DX Anatomy Image	Image Laterality
Anatomic Region Sequence		(0008,2218)
>Code Value		(0008,0100)
>Coding Scheme Designator		(0008,0102)
>Code Meaning		(0008,0104)
DX Image	Pixel Intensity Relationship	(0029,1040)
	Pixel Intensity Relationship Sign	(0028,1041)
	Rescale Intercept	(0028,1052)
	Rescale Slope	(0028,1053)
	Rescale Type	(0028,1054)
	Window Center	(0028,1050)
	Window Width	(0028,1051)

DX Detector	Detector Type	(0018,7004)
	Imager Pixel Spacing	(0018,1164)
DX Positioning	View Position	(0018,5101)
	View Code Sequence	(0054,0220)
	>Code Value	(0008,0100)
	>Coding Scheme Designator	(0008,0102)
	>Code Meaning	(0008,0104)
	>View Modifier Code Sequence	(0054,0222)
	>>Code Value	(0008,0100)
	>>Coding Scheme Designator	(0008,0102)
	>>Code Meaning	(0008,0104)
	Positioner Type	(0018,1508)
Mammography Image	Organ Exposed	(0040,0318)
	Implant Present	(0028,1300)
	Partial View	(0028,1350)
	Partial View Description	(0028,1351)
Acquisition Context	Acquisition Context Sequence	(0040,0555)
SOP Common	SOP Class UID	(0008,0016)
	SOP Instance UID	(0008,0018)
CP-393	Partial View Code Sequence	(0028,1352)
	>Code Value	(0008,0100)
	>Coding Scheme Designator	(0008,0102)
	>Code Meaning	(0008,0104)

### 3.1.2.2 Retrieve a Modality Worklist from a Remote System

#### 3.1.2.2.1 Associated Real World Activity

The PenScan system can query a remote device for a Modality Worklist to aid in populating patient demographics into PenScan worklist. The PenScan system will search the worklist by a date range and Modality.

#### 3.1.2.2.2 Accepted Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Modality Worklist Query	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None



### 3.1.2.2.3 SOP Specific Conformance for SOP Class Storage

The fields below are always included in the query request to ask the SCP to return them for each response.

Modality Worklist Query		
Module	Description	Tag
Scheduled Procedure Step	Schedule Procedure Step Sequence	(0040,0100)
	> Schedule Procedure Step Start Time	(0040,0002)
	> Schedule Procedure Step Stop Time	(0040,0003)
	> Modality	(0008,0060)
Patient Identification	Patient's Name	(0010,0010)
	Patient ID	(0010,0020)
	Other Patient Ids	(0010,1040)
Patient Demographics	Patient Birth Date	(0010,0030)
	Patient Sex	(0010,0040)
Imaging Service Request	Referring Physicians Name	(0008,0090)
Requested Procedure	Requesting Physician	(0032,1032)

### 3.1.2.3 Query Patient/Study from a Remote System

#### 3.1.2.3.1 Associated Real World Activity

The PenScan system can query a remote device for Patient and Study information. PenScan can search for patients by Name or ID.

#### 3.1.2.3.2 Accepted Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Patient Root Query	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

#### 3.1.2.3.3 SOP Specific Conformance for Query SOP Classes

Fields retrieved are listed in the tables below.

Patient Root Query		
Patient Level		
Module	Description	Tag
Patient Identification	Patient's Name	(0010,0010)
	Patient ID	(0010,0020)
	Other Patient Ids	(0010,1040)
Patient Demographics	Patient Birth Date	(0010,0030)
	Patient Sex	(0010,0040)

Study Level		
Module	Description	Tag
Patient Identification	Patient ID	(0010,0020)
General Study	Study Date	(0008,0020)
	Study Time	(0008,0030)
	Accession Number	(0008,0050)
	Study Description	(0008,1030)
	Study Instance UID	(0020,000D)

## 4 Communication Profiles

### 4.1 Supported Communication Stacks

PenScan system provides DICOM v3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard

### 4.2 TCP/IP Stack

PenScan system utilizes the TCP/IP stack from the Microsoft Windows platform.

#### 4.2.1 Physical Media Supported

PenScan system is independent of the physical medium over which TCP/IP executes. Any device listed in the Microsoft Windows Hardware compatibility list may be used

## 5 Extensions/Specialization/Privatizations

Not applicable.

## 6 Configuration

The PenScan system utilizes XML configuration files for the setting of all configurable settings.