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# DICOM

## Conformance Statement

PercuNav Release 3.0.x  
000168000000036 Rev. A  
2010-08-31



Standalone



Integrated

**0.1****REVISION HISTORY**

<b>Document Version</b>	<b>Date of Issue</b>	<b>Author</b>	<b>Description</b>
A	August 31, 2010	M. Leif	Initial Release

# 1 CONFORMANCE STATEMENT OVERVIEW

The Philips PercuNav 3.0.x system implements the necessary DICOM® services to allow import of pre-operative images via network and export of screen captures via network.

PercuNav primarily works in conjunction with an iU22 ultrasound system. It acts as a router for iU22 communications.

This DICOM Conformance Statement applies to both Integrated PercuNav and Standalone Percunav products.

Table 1-1 provides an overview of the supported network services.

**Table 1-1  
NETWORK SERVICES**

<b>Networking SOP Classes*</b>	<b>User of Service (SCU)</b>	<b>Provider of Service (SCP)</b>
CT Image Storage	No	Yes
MR Image Storage	No	Yes
Positron Emission Tomography Image Storage IOD	No	Yes
Secondary Capture Image Storage	Yes	Yes
Multi-frame True Color Secondary Capture Image Storage	Yes**	No
Study Root Query / Retrieve	Yes	No
Verification	Yes	Yes

\*See Table 4.2-10 for the complete list of SOP Class UIDs used.

\*\* Note: this SOP Class is mutually exclusive with Secondary Capture. Configurable option.

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## 3 INTRODUCTION

### 3.1 AUDIENCE

This document is intended for hospital staff, health care system integrators, software designers or implementers. It is assumed that the reader has a working understanding of DICOM.

### 3.2 REMARKS

DICOM, by itself, does not guarantee interoperability. However, the Conformance Statement facilitates a first-level validation for interoperability between different applications supporting the same DICOM functionality.

This Conformance Statement is not intended to replace validation with other DICOM equipment to ensure proper exchange of information intended.

The scope of this Conformance Statement is to facilitate communication between Philips Medical Systems and other vendors' Medical equipment. The Conformance Statement should be read and understood in conjunction with the DICOM Standard [DICOM]. However, by itself it is not guaranteed to ensure the desired interoperability and successful interconnectivity.

The user should be aware of the following important issues:

- The comparison of different conformance statements is the first step towards assessing interconnectivity between Philips Medical Systems and non - Philips Medical Systems equipment.
- Test procedures should be defined to validate the desired level of connectivity.
- The DICOM standard will evolve to meet the users' future requirements. Philips Medical Systems is actively involved in developing the standard further and therefore reserves the right to make changes to its products or to discontinue its delivery.
- This DICOM Conformance Statement reports the implementation of PercuNav with release 3.0.x.

### 3.3 DEFINITIONS, TERMS AND ABBREVIATIONS

Definitions, terms and abbreviations used in this document are defined within the different parts of the DICOM standard.

Abbreviations and terms are as follows:

AE	DICOM Application Entity
AET	Application Entity Title
ASCE	Association Control Service Element
CD-R	Compact Disk Recordable
CSE	Customer Service Engineer
DICOM	Digital Imaging and Communications in Medicine
FSC	File-Set Creator
FSU	File-Set Updater
FSR	File-Set Reader
IOD	(DICOM) Information Object Definition
ISO	International Standard Organization

PDU	DICOM Protocol Data Unit
PDE	Patient Data Entry
SCU	DICOM Service Class User (DICOM client)
SCP	DICOM Service Class Provider (DICOM server)
SOP	DICOM Service-Object Pair
US	Ultrasound

### **3.4 REFERENCES**

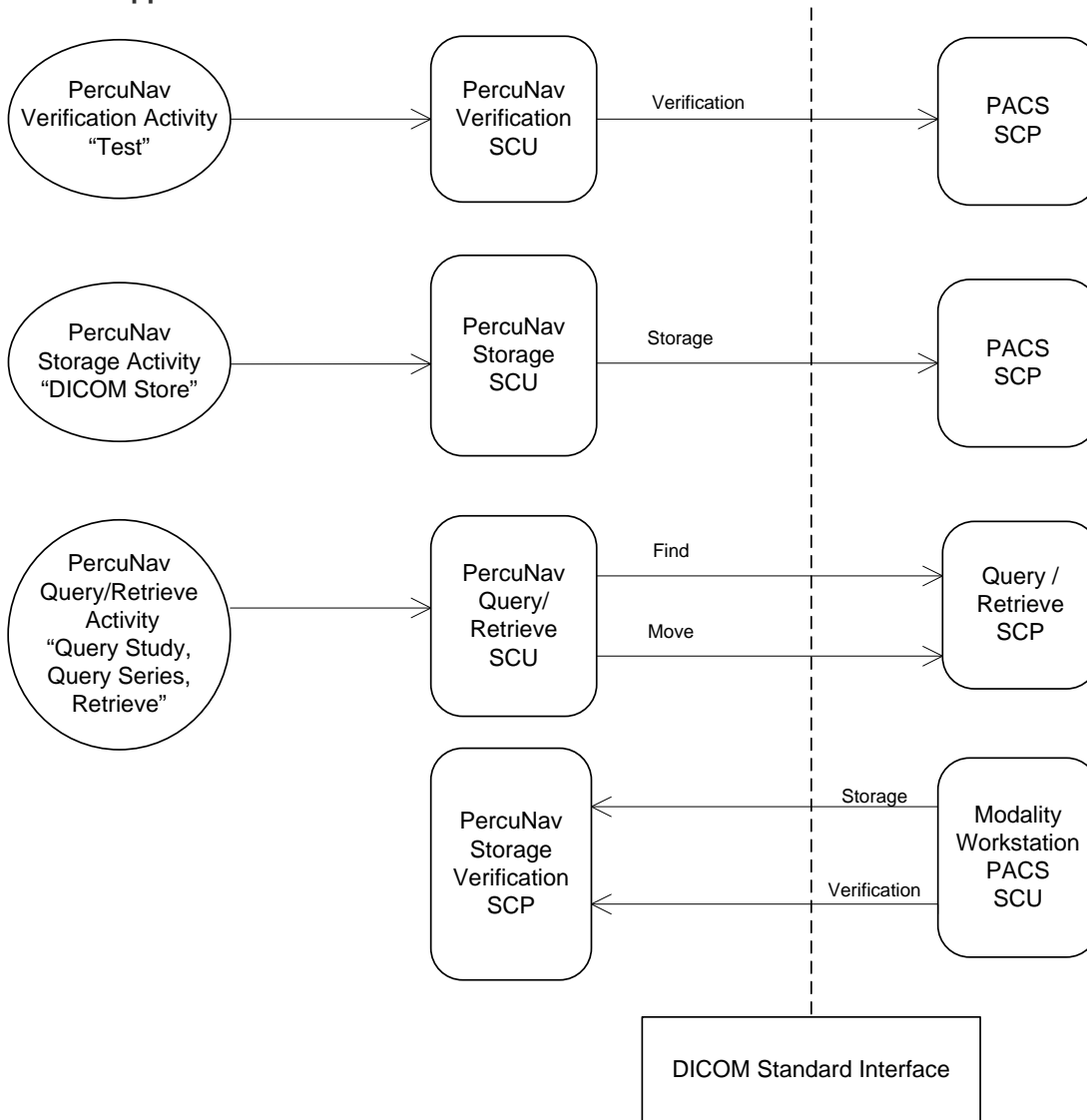
[DICOM] Digital Imaging and Communications in Medicine (DICOM), NEMA PS 3.1-3.18, 2008



## 4 NETWORKING

### 4.1 IMPLEMENTATION MODEL

#### 4.1.1 Application Data Flow



#### 4.1.2 Functional Definition of AEs

##### 1. Verification Service as SCU

PercuNav, supporting the Verification SOP Class SCU role, requests verification of communication to a PACS SCP. This request is performed using the C-ECHO request primitive.

The PACS SCP, supporting the Verification SOP Class SCP role, issues a C-ECHO response primitive.

Upon receipt of the C-ECHO confirmation, PercuNav determines that verification is complete.

## **2. Image Storage Service as SCU**

PercuNav invokes a C-STORE Service with a PACS SCP Instance which meets the requirements of the corresponding IOD.

PercuNav shall recognize the status of the C-STORE service and take appropriate action upon the success or failure of the service.

## **3. Query and Retrieve Service as SCU**

PercuNav invokes a Query service to get required information to populate Patient Information data when needed. For such a purpose, only the query part of the service (C-FIND) is used. It then establishes one association with the remote Query and Retrieve SCP, performs a Find request, wait for responses, and then release the association. It does not and cannot be used to request any move operation.

After PercuNav receives the Studies returned from the Study-level query, it will display a list of Series from which the user may choose which to request Retrieve. It will open an association for the Series-Level Find request, wait for responses then release the association.

PercuNav will invoke a Retrieve service at user request to get images locally from a PACS. It will establish one association with the remote Query and Retrieve SCP, performs a Move request, waits for responses, and then may either release the association or may ask for image/series/study retrieval before releasing the association.

## **4. Image Storage Service as SCP**

PercuNav waits for another application to connect at the presentation address configured for its Application Entity Title.

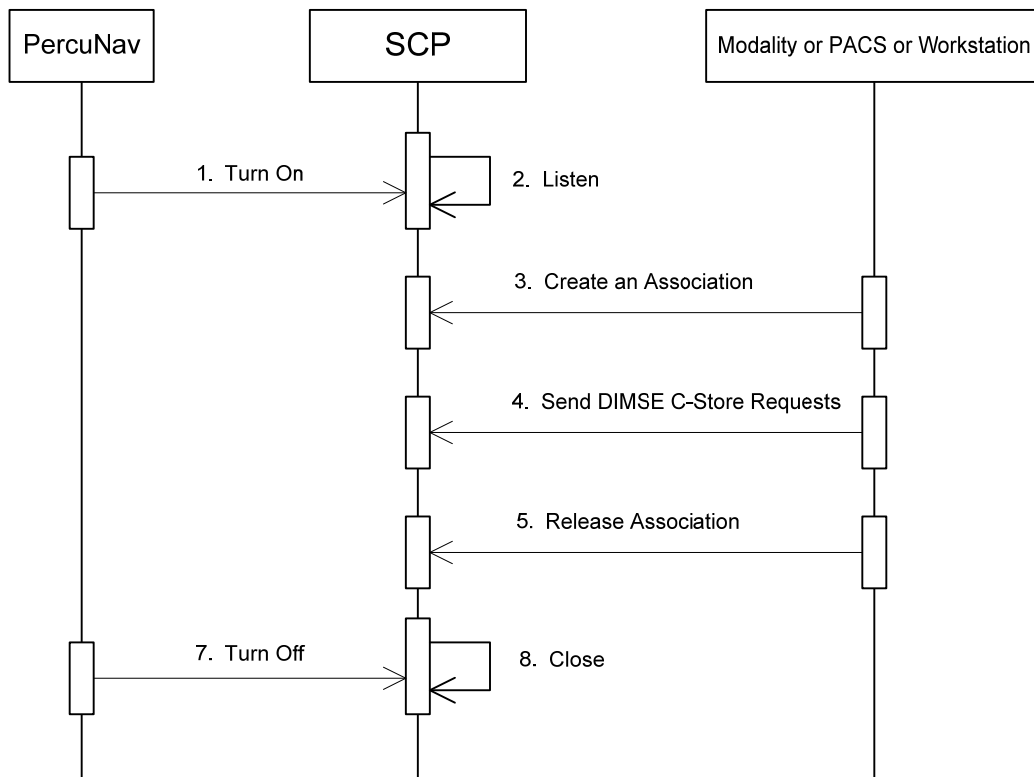
When another application requests a connection with PercuNav, PercuNav will accept associations with Presentation Contexts for SOP Classes of the Storage Service Class.

## **5. Verification Service as SCP**

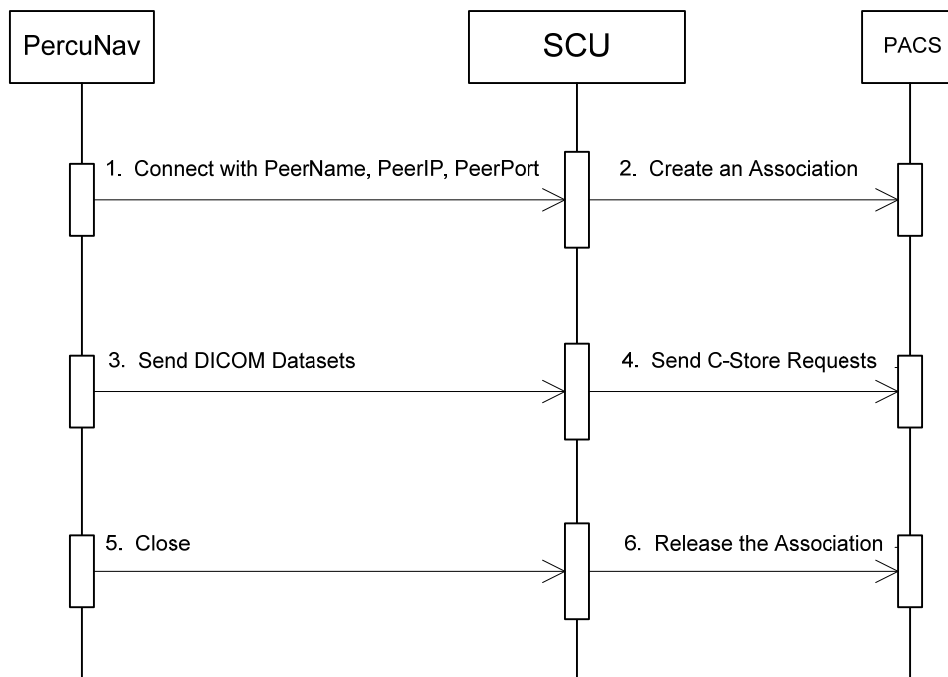
PercuNav waits for another application to connect at the presentation address configured for its Application Entity Title. When another application requests a connection with PercuNav, PercuNav will accept associations with Presentation Contexts for SOP Classes of the Verification Service Class.

### 4.1.3 Sequencing of Real-World Activities

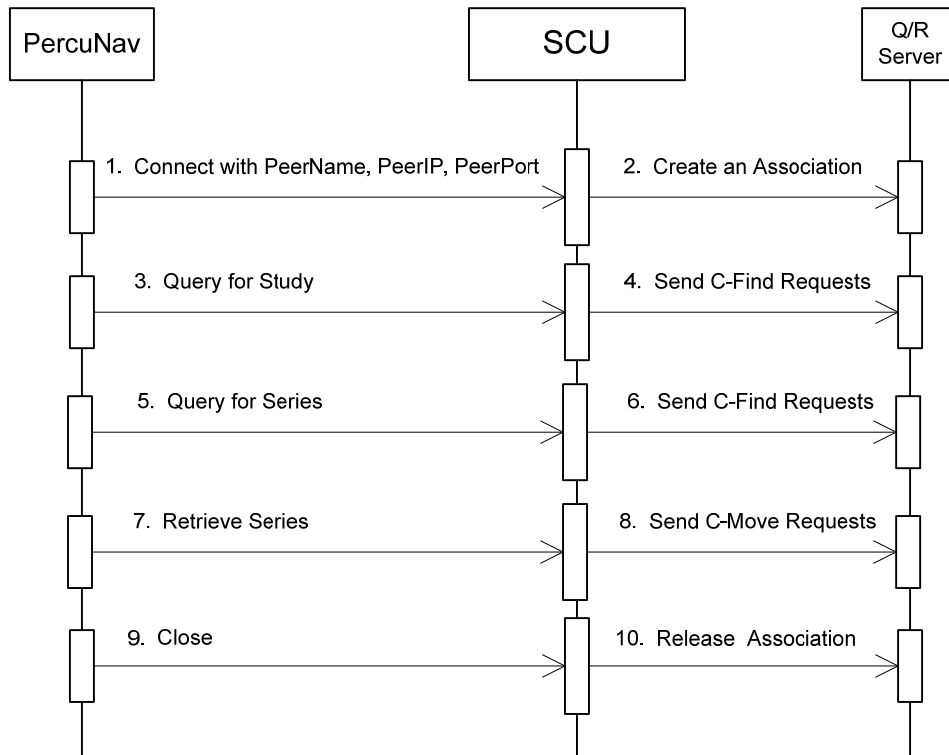
#### 1. Sequencing of PercuNav's activities as a Storage SCP



#### 2. Sequencing of PercuNav's activities as Storage SCU



### 3. Sequencing of PercuNav's activities as Query / Retrieve SCU



## 4.2 AE SPECIFICATIONS

### 4.2.1 PercuNav Verification Application Entity

#### 4.2.1.1 SOP Classes

This application entity provides Standard Conformance to the following SOP Class:

**Table 4.2-1  
SOP CLASSES FOR PercuNav Verification Entity**

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	Yes	Yes

#### 4.2.1.2 Association Establishment Policy

##### 4.2.1.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

**Table 4.2-2  
DICOM APPLICATION CONTEXT FOR PercuNav Verification Entity**

Application Context Name	1.2.840.10008.3.1.1.1
--------------------------	-----------------------

- Minimum PDU size accepted: 8192 bytes
- Maximum PDU size accepted: 16384 bytes

##### 4.2.1.2.2 Number of Associations

**Table 4.2-3  
NUMBER OF ASSOCIATIONS AS AN ASSOCIATION INITIATOR FOR THIS AE**

Maximum number of simultaneous Associations	1
---------------------------------------------	---

**Table 4.2-4  
NUMBER OF ASSOCIATIONS AS AN ASSOCIATION ACCEPTOR FOR THIS AE**

Maximum number of simultaneous Associations	5
---------------------------------------------	---

##### 4.2.1.2.3 Asynchronous Nature

PercuNav does not support asynchronous communication (multiple outstanding transactions over a single Association).

**Table 4.2-5  
ASYNCHRONOUS NATURE AS A SCU FOR THIS AE**

Maximum number of outstanding asynchronous transactions	1
---------------------------------------------------------	---

##### 4.2.1.2.4 Implementation Identifying Information

- PercuNav SCP will respond with the following implementation information:

Name	SOP Class UID
Implementation Class UID	1.2.250.1.59.3.0.3.5.3
Implementation Version Name	ETIAM_DCMTK_353

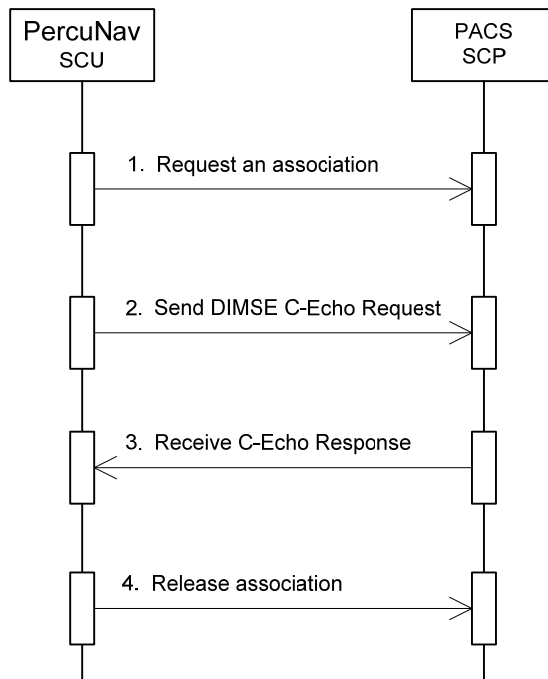
- PercuNav SCU's request will include with the following implementation information:

Name	SOP Class UID
Implementation Class UID	1.3.46.670589.43.2
Implementation Version Name	PercuNav_3.0

### 4.2.1.3 Association Initiation Policy

#### 4.2.1.3.1 PercuNav Verification SCU Activity

##### 4.2.1.3.1.1 Description and Sequencing of Activities



##### 4.2.1.3.1.2 Proposed Presentation Contexts

PercuNav will propose Presentation Contexts as shown in the following table:

**Table 4.2-6  
PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY VERIFICATION**

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

**4.2.1.3.1.3 SOP Specific Conformance for Verification**

Table 4.2-7 summarizes the behavior of PercuNav when receiving status codes in a C-ECHO response.

A message will appear on the user interface if PercuNav receives any other SCP response status than “Success.”

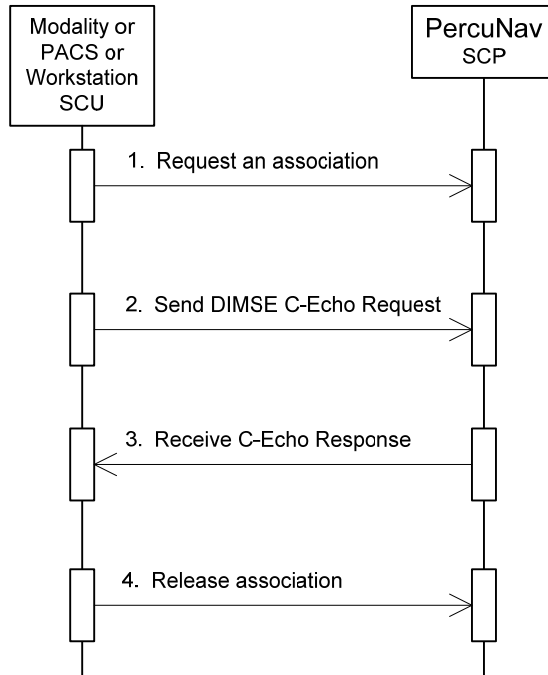
**Table 4.2-7  
VERIFICATION C-ECHO RESPONSE STATUS HANDLING BEHAVIOR**

Service Status	Further Meaning	Error Codes	Related Fields
Failure	Refused: Out of Resources	A7xx	(0000,0902)
	Error: Data Set does not match SOP Class	A9xx	(0000,0901) (0000,0902)
	Error: Cannot understand	Cxxx	(0000,0901) (0000,0902)
Warning	Coercion of Data Elements	B000	(0000,0901) (0000,0902)
	Data Set does not match SOP Class	B007	(0000,0901) (0000,0902)
	Elements Discarded	B006	(0000,0901) (0000,0902)
Success		0000	None

**4.2.1.4 Association Acceptance Policy**

**4.2.1.4.1 PercuNav Verification SCP Activity**

**4.2.1.4.1.1. Description and Sequencing of Activities**



#### 4.2.1.4.1.2 Proposed Presentation Contexts

PercuNav will accept Presentation Contexts as shown in the following table:

**Table 4.2-8  
PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY VERIFICATION**

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None

#### 4.2.2.3.1.3 SOP Specific Conformance for Verification

Table 4.2-9 summarizes the behavior of PercuNav when receiving status codes in a C-ECHO response.

A message will appear on the user interface if PercuNav receives any other SCP response status than “Success.”

**Table 4.2-9  
VERIFICATION C-ECHO RESPONSE STATUS HANDLING BEHAVIOR**

Service Status	Further Meaning	Error Codes	Related Fields
Failure	Refused: Out of Resources	A7xx	(0000,0902)
	Error: Data Set does not match SOP Class	A9xx	(0000,0901) (0000,0902)
	Error: Cannot understand	Cxxx	(0000,0901) (0000,0902)
Warning	Coercion of Data Elements	B000	(0000,0901) (0000,0902)



	Data Set does not match SOP Class	B007	(0000,0901) (0000,0902)
	Elements Discarded	B006	(0000,0901) (0000,0902)
Success		0000	None

## 4.2.2 Pecunav Storage Application Entity

### 4.2.2.1 SOP Classes

Percunav provides Standard Conformance to the following SOP Classes:

**Table 4.2-10**  
**SOP CLASSES FOR Percunav Storage Entity**

SOP Class Name	SOP Class UID	SCU	SCP
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	No	Yes
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	No	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	Yes
Multi-frame True Color Secondary Capture Image Storage*	1.2.840.10008.5.1.4.1.1.7.4	Yes	No

\*This SOP Class is mutually exclusive with Secondary Capture. Determined by configuration setting.

### 4.2.2.2 Association Establishment Policy

#### 4.2.2.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

**Table 4.2-11**  
**DICOM APPLICATION CONTEXT FOR Percunav Storage Entity**

Application Context Name	1.2.840.10008.3.1.1.1
--------------------------	-----------------------

- Minimum PDU size accepted: 8192 bytes
- Maximum PDU size accepted: 16384 bytes

#### 4.2.2.2.2 Number of Associations

**Table 4.2-12**  
**NUMBER OF ASSOCIATIONS AS AN ASSOCIATION INITIATOR FOR THIS AE**

Maximum number of simultaneous Associations	1
---------------------------------------------	---

**Table 4.2-13**  
**NUMBER OF ASSOCIATIONS AS AN ASSOCIATION ACCEPTOR FOR THIS AE**

Maximum number of simultaneous Associations	5
---------------------------------------------	---

#### 4.2.2.2.3 Asynchronous Nature

Percunav does not support asynchronous communication (multiple outstanding transactions over a single Association).

**Table 4.2-14**  
**ASYNCHRONOUS NATURE AS A SCU FOR THIS AE**

Maximum number of outstanding asynchronous transactions	1
---------------------------------------------------------	---

#### 4.2.1.2.4 Implementation Identifying Information

- PercuNav SCP will respond with the following implementation information:

Name	SOP Class UID
Implementation Class UID	1.2.250.1.59.3.0.3.5.3
Implementation Version Name	ETIAM_DCMTK_353

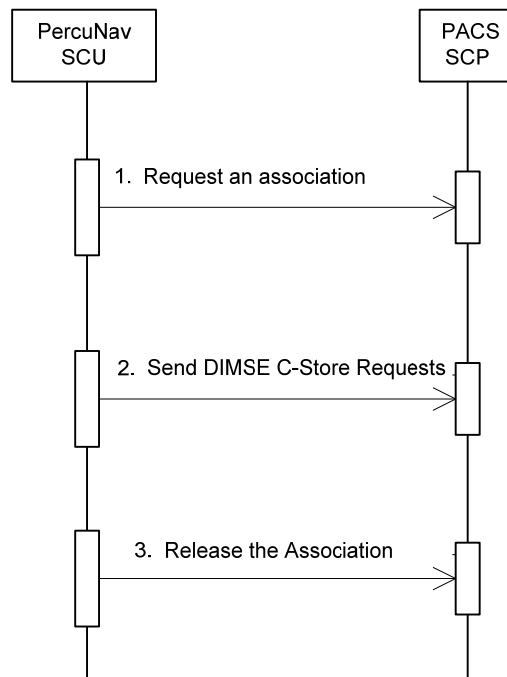
- PercuNav SCU's request will include the following implementation information:

Name	SOP Class UID
Implementation Class UID	1.3.46.670589.43.2
Implementation Version Name	PercuNav_3.0

#### 4.2.2.3 Association Initiation Policy

##### 4.2.2.3.1 PercuNav Storage SCU Activity

###### 4.2.2.3.1.1 Description and Sequencing of Activities



#### 4.2.2.3.1.2 Proposed Presentation Contexts

PercuNav will propose the following Presentation Context:

**Table 4.2 - 15  
PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY SEND IMAGES**

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Multi-frame True Color Secondary Capture Image Storage*	1.2.840.10008.5.1.4.1.1.7.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Default setting is Secondary Capture Image Storage SOP Class. By configuration option set by service, Multi-frame True Color Secondary Capture Image Storage may be selected instead. The two SOP Classes are mutually exclusive.

#### 4.2.2.3.1.3 SOP Specific Conformance for Image Storage SOP Classes

All Image Storage SOP Classes supported by the Storage AE exhibit the same behavior, except where stated, and are described together in this section.

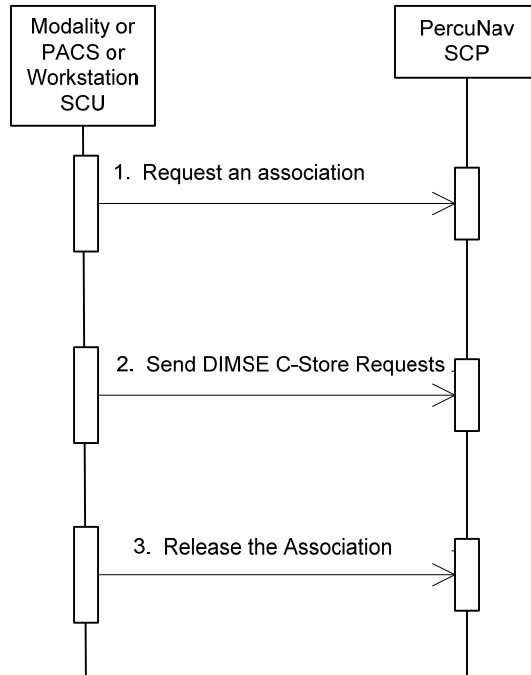
Table 4.2-16 below defines the specific status code values which might be returned in a C-STORE response. General status code values and fields related to status code values are defined in PS 3.7.

**Table 4.2-16  
STORAGE C-STORE RESPONSE STATUS HANDLING BEHAVIOR**

Service Status	Further Meaning	Error Codes	Related Fields
Failure	Refused: Out of Resources	A7xx	(0000,0902)
	Error: Data Set does not match SOP Class	A9xx	(0000,0901) (0000,0902)
	Error: Cannot understand	Cxxx	(0000,0901) (0000,0902)
Warning	Coercion of Data Elements	B000	(0000,0901) (0000,0902)
	Data Set does not match SOP Class	B007	(0000,0901) (0000,0902)
	Elements Discarded	B006	(0000,0901) (0000,0902)
Success		0000	None

#### 4.2.2.3.2 PercuNav Storage SCP Activity

##### 4.2.2.3.2.1 Description and Sequencing of Activities



#### 4.2.2.3.2.2 Proposed Presentation Contexts

PercuNav will propose the following Presentation Context:

**Table 4.2-17  
PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY STORAGE IMAGES AS SCP**

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None
Secondary Capture Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None

#### 4.2.2.3.2.3 SOP Specific Conformance for Image Storage SOP Classes

All Image Storage SOP Classes supported by the Storage AE exhibit the same behavior, except where stated, and are described together in this section.

Table 4.2-18 below defines the specific status code values which might be returned in a C-STORE response. General status code values and fields related to status code values are defined in PS 3.7.

**Table 4.2-18  
STORAGE C-STORE RESPONSE STATUS HANDLING BEHAVIOR**

Service Status	Further Meaning	Error Codes	Related Fields
Failure	Refused: Out of Resources	A7xx	(0000,0902)
	Error: Data Set does not match SOP Class	A9xx	(0000,0901) (0000,0902)
	Error: Cannot understand	Cxxx	(0000,0901) (0000,0902)
Warning	Coercion of Data Elements	B000	(0000,0901) (0000,0902)
	Data Set does not match SOP Class	B007	(0000,0901) (0000,0902)
	Elements Discarded	B006	(0000,0901) (0000,0902)
Success		0000	None

#### 4.2.3 PercuNav Query/Retrieve Application Entity

##### 4.2.3.1 SOP Classes

This application entity provides Standard Conformance to the following SOP Classes:

**Table 4.2-19  
SOP CLASSES FOR PercuNav Query/Retrieve Entity**

SOP Class Name	SOP Class UID	SCU	SCP
Study Root Query/Retrieve Information Model - Find	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root Query/Retrieve Information Model - Move	1.2.840.10008.5.1.4.1.2.2.2	Yes	No

##### 4.2.3.2 Association Establishment Policy

###### 4.2.3.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

**Table 4.2-20  
DICOM APPLICATION CONTEXT FOR PercuNav Query/Retrieve Entity**

Application Context Name	1.2.840.10008.3.1.1.1
--------------------------	-----------------------

- Minimum PDU size accepted: 8192 bytes
- Maximum PDU size accepted: 16384 bytes

###### 4.2.3.2.2 Number of Associations

**Table 4.2-21  
NUMBER OF ASSOCIATIONS AS AN ASSOCIATION INITIATOR FOR THIS AE**

Maximum number of simultaneous Associations	1
---------------------------------------------	---

**Table 4.2-22  
NUMBER OF ASSOCIATIONS AS AN ASSOCIATION ACCEPTOR FOR THIS AE**

Maximum number of simultaneous Associations	1
---------------------------------------------	---

**4.2.3.2.3 Asynchronous Nature**

PercuNav does not support asynchronous communication (multiple outstanding transactions over a single Association).

**Table 4.2-23  
ASYNCHRONOUS NATURE AS A SCU FOR THIS AE**

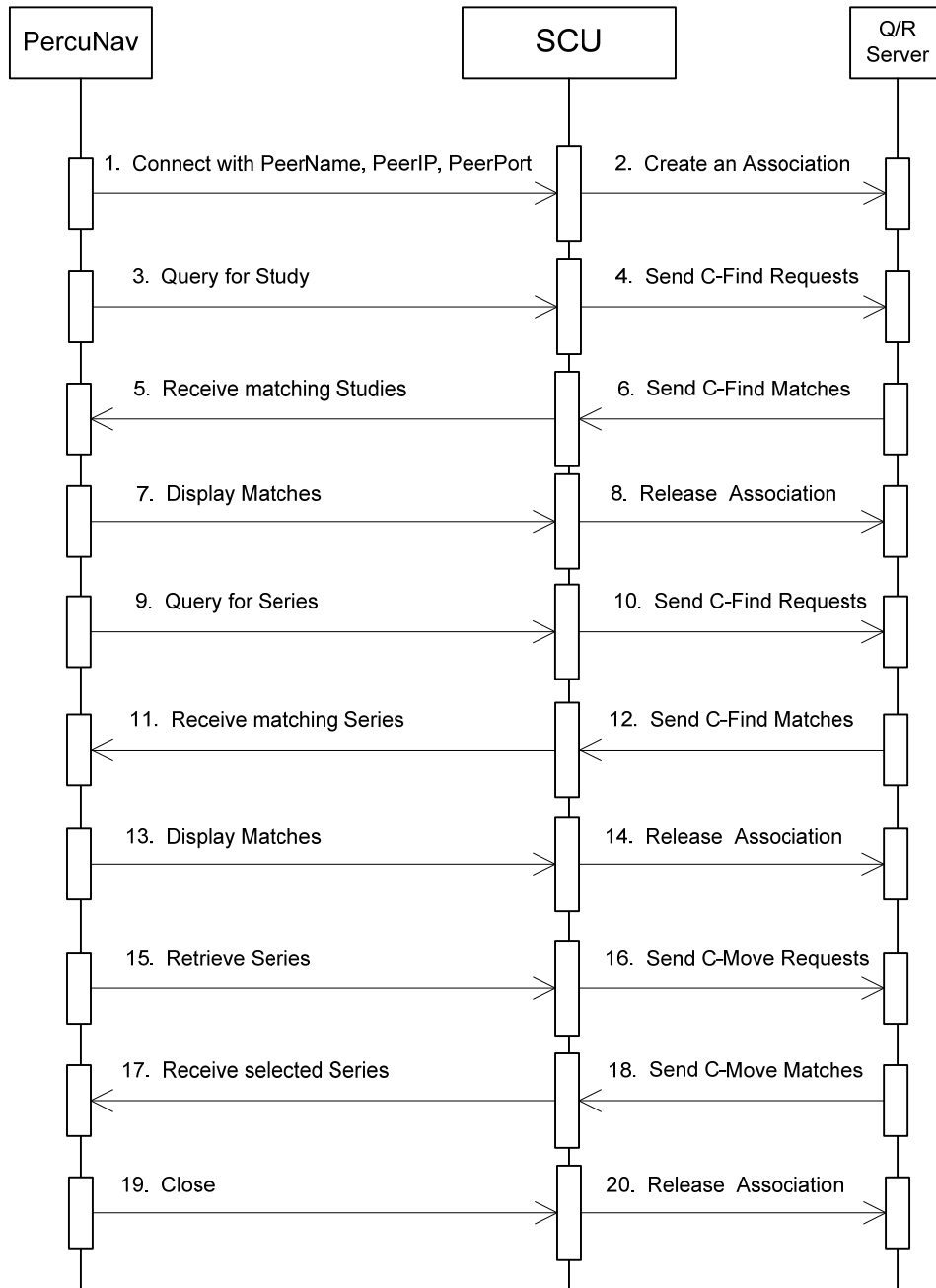
Maximum number of outstanding asynchronous transactions	1
---------------------------------------------------------	---

**4.2.3.2.4 Implementation Identifying Information**

- PercuNav Query/Retrieve SCU will request with the following implementation information:

<b>Name</b>	<b>SOP Class UID</b>
Implementation Class UID	1.2.250.1.59.3.0.3.5.3
Implementation Version Name	ETIAM_DCMTK_353

4.2.3.3 Association Initiation Policy  
 4.2.3.3.1 PercuNav Query / Retrieve SCU Activity  
 4.2.3.3.1.1 Description and Sequencing of Activities





#### 4.2.3.3.1.2 Proposed Presentation Contexts

PercuNav will propose Presentation Contexts as shown in the following table:

**Table 4.2-24  
PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY QUERY/RETRIEVE**

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Study Root Query/Retrieve Information Model - Find	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None
Study Root Query/Retrieve Information Model - Move	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None

#### 4.2.3.3.1.3 SOP Specific Conformance for Query/Retrieve

Table 4.2-25 lists the attributes used in the Query/Retrieve C-Find and C-Move request messages sent from PercuNav.

**Table 4.2-25  
STUDY ROOT REQUEST IDENTIFIER FOR QUERY/RETRIEVE SCU C-FIND AND C-MOVE**

Attribute Name	Tag	VR	Comments	Presence of Value	Source
<b>STUDY Level Query</b>					
Patient's Name	(0010,0010)	PN	Single Value Matching / Wild card Matching	VNAP	USER
Patient ID	(0010,0020)	LO	Single Value Matching	VNAP	USER
Patient's Birth Date	(0010,0030)	DA		EMPTY	
Patient's Sex	(0010,0040)	CS		EMPTY	
Study Instance UID	(0020,000D)	UI		EMPTY	
Study ID	(0020,0010)	SH		EMPTY	
Study Date	(0008,0020)	DA	Range Matching	VNAP	USER
Study Time	(0008,0030)	TM		EMPTY	
Accession Number	(0008,0050)	SH	Single Value Matching	VNAP	USER
Referring Physician's Name	(0008,0090)	PN		EMPTY	
Query/Retrieve Level	(0008,0052)	CS	"STUDY"	ALWAYS	AUTO
Modalities in Study	(0008,0061)	CS		EMPTY	
Study Description	(0008,1030)	SH		EMPTY	
Name of Physician(s) Reading Study	(0008,1060)	PN		EMPTY	

Attribute Name	Tag	VR	Comments	Presence of Value	Source
Number of Study Related Series	(0020,1206)	IS		EMPTY	
Number of Study Related Instances	(0020,1208)	IS		EMPTY	
<b>SERIES Level Query</b>					
Series Number	(0020,0011)	IS		EMPTY	
Series Description	(0008,103E)	SH		EMPTY	
Modality	(0008,0060)	CS	"CT", "MR", "PT", or empty	VNAP	USER
Query/Retrieve Level	(0008,0052)	CS	"SERIES"	ALWAYS	AUTO
Study Instance UID	(0020,000D)	UI		EMPTY	
Series Instance UID	(0020,000E)	UI		EMPTY	
Number of Series Related Instances	(0020,1209)	IS		EMPTY	
<b>Move Request Attributes</b>					
Query/Retrieve Level	(0008,0052)	CS	"SERIES"	ALWAYS	AUTO
Study Instance UID	(0020,000D)	UI	Value from selected Study	ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI	Value from selected series	ALWAYS	AUTO

#### 4.2.3.3.1.4 Query/Retrieve C-Find/C-Move Response Status

Table 4.2-26 summarizes the behavior of PercuNav when receiving status codes in a C-Find/C-Move response.

A message will appear on the user interface if PercuNav receives any other SCP response status than "Success."

**Table 4.2-26  
QUERY/RETRIEVE C-FIND/C-MOVE RESPONSE STATUS HANDLING BEHAVIOR**

Service Status	Further Meaning	Error Codes	Related Fields
Failure	Refused: Out of Resources	A7xx	(0000,0902)
	Error: Data Set does not match SOP Class	A9xx	(0000,0901) (0000,0902)
	Error: Cannot understand	Cxxx	(0000,0901) (0000,0902)
Warning	Coercion of Data Elements	B000	(0000,0901) (0000,0902)
	Data Set does not match SOP Class	B007	(0000,0901) (0000,0902)
	Elements Discarded	B006	(0000,0901) (0000,0902)
Success		0000	None

### 4.3 PHYSICAL NETWORK INTERFACES

#### 4.3.1 Supported Communication Stacks

##### 4.3.1.1 TCP/IP Stack

The PercuNav provides DICOM TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

#### 4.3.2 Physical Network Interface

The PercuNav supports a single network interface. The following physical network interface is available:

**Table 4.3-1  
SUPPORTED PHYSICAL NETWORK INTERFACE**

Ethernet 10/100/1000 Full / Half Duplex, Auto Detected, RJ-45. This is not user configurable.
-----------------------------------------------------------------------------------------------

### 4.4 CONFIGURATION

#### 4.4.1 AE Title/Presentation Address Mapping

##### 4.4.1.1 Local AE Title

**Table 4.4-1  
AE TITLE CONFIGURATION TABLE**

Application Entity	Default AE Title	Default TCP/IP Port
PercuNav Storage SCP	PercuNav	105
PercuNav Verification SCU	PercuNav	Random
PercuNav Storage SCU	PercuNav	Random
PercuNav Query/Retrieve SCU	PercuNav	Random

PercuNav SCP application entity (WinSCP) provides a configuration user interface. By this interface, the user can change local AE Title and TCP/IP port. Note: The AE Title in WinSCP must be manually edited in the "Setup UI" for the PercuNav's SCP AE Title.

PercuNav SCU application entity (used for Verification, Storage and Query/Retrieve) shall get information about the Storage SCU. User has to edit local AE Title in the "Setup UI."

PercuNav will act as a router for DICOM communications to and from the iU22. All Ultrasound DICOM functions are configured normally. Note the necessity for the ultrasound system IP Address to be static, and assigned to an address that will allow the PercuNav and iU22 to communicate on their isolated network.

Also note the use of listening ports on iU22 and PercuNav and use different ports for each.

By default, the iU22 listens on port 104, and PercuNav listens on Port 105. Changing these values should be done by a qualified service representative to ensure continued functionality.

#### 4.4.1.2 Remote AE Title/Presentation Address Mapping

##### 4.4.1.2.1 Remote Device Configuration

Remote devices are configured using the "Setup UI." In this UI, there are locations for entering a descriptive name for the device, its AE Title, IP Address and listening Port. After entering this data, the user "Adds" the device.

To make this device active as a storage SCP, the entry is highlighted in the top left box and the "Register" button is pressed.

## **5 SUPPORT OF CHARACTER SETS**

All PercuNav DICOM applications support the

ISO\_IR 100 (ISO 8859-1:1987 Latin Alphabet No. 1 supplementary set)

## **6 SECURITY**

DICOM security is not implemented on the PercuNav at this time.

PercuNav incorporates an internal firewall that only accepts incoming traffic on the designated listening port, as configured in system configuration file.

## ANNEX A : PercuNav Screen Capture

### A.1 CREATED IOD INSTANCES

Table 8.1-1 specifies the attributes of a Multi-frame True Color Secondary Capture Image Storage and Table 8.1-1-1 specifies the attributes of a Secondary Capture Image Storage transmitted by the PercuNav application entity

The following tables use a number of abbreviations. The abbreviations used in the “Presence of ...” column are:

- VNAP Value Not Always Present (attribute sent zero length if no value is present)
- ANAP Attribute Not Always Present
- ALWAYS Always Present
- EMPTY Attribute is sent without a value

The abbreviations used in the “Source” column:

- USER the attribute value source is from User input
- AUTO the attribute value is generated automatically
- CONFIG the attribute value source is a configurable parameter

#### A.1.1 Secondary Capture Image IODs

**Table 8.1-1**  
Multi-frame True Color Secondary Capture Image IOD Modules

IE	Module	Reference	Presence of Module
Patient	Patient	Table 8.1-2	ALWAYS
Study	General Study	Table 8.1-3	ALWAYS
Series	General Series	Table 8.1-4	ALWAYS
Equipment	SC Equipment	Table 8.1-5	ALWAYS
Image	General Image	Table 8.1-6	ALWAYS
	Image Pixel	Table 8.1-7	ALWAYS
	Multi-frame Image	Table 8.1-8	ALWAYS
	SC Multi-frame Image	Table 8.1-9	ALWAYS
	SOP Common	Table 8.1-10	ALWAYS

**Table 8.1-1-1**  
Secondary Capture Image IOD Modules

IE	Module	Reference	Presence of Module
Patient	Patient	Table 8.1-2	ALWAYS
Study	General Study	Table 8.1-3	ALWAYS
Series	General Series	Table 8.1-4	ALWAYS
Equipment	SC Equipment	Table 8.1-5	ALWAYS
Image	General Image	Table 8.1-6	ALWAYS
	Image Pixel	Table 8.1-7	ALWAYS
	SOP Common	Table 8.1-10	ALWAYS

A.1.2 Common Modules

**Table 8.1-2  
PATIENT MODULE**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient's Name	(0010,0010)	PN	Same as PercuNav input or "Anonymized" *	ALWAYS	AUTO
Patient ID	(0010,0020)	LO	Same as PercuNav input or "Anonymized" *	ALWAYS	AUTO
Patient's Birth Date	(0010,0030)	DA	Same as PercuNav input or "19000101" *	VNAP	AUTO
Patient's Sex	(0010,0040)	CS	Same as PercuNav input or "O" *	ALWAYS	AUTO

\*Alternate data is in Ultrasound only procedures where no reference data is available.

**Table 8.1-3  
GENERAL STUDY MODULE**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Study Instance UID	(0020,000D)	UI	Auto generated	ALWAYS	AUTO
Study Date	(0008,0020)	DA	Auto generated	ALWAYS	AUTO
Study Time	(0008,0030)	TM	Auto generated	ALWAYS	AUTO
Referring Physician's Name	(0008,0090)	PN	Auto generated	VNAP	AUTO
Study ID	(0020,0010)	SH	Auto generated	ALWAYS	AUTO
Accession Number	(0008,0050)	SH	Auto generated, or user input	VNAP	AUTO / USER

**Table 8.1-4  
GENERAL SERIES MODULE**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	"OT"	ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI	Auto-generated	ALWAYS	AUTO
Series Number	(0020,0011)	IS	Auto-generated	ALWAYS	AUTO
Series Date	(0008,0021)	DA	Auto-generated	ALWAYS	AUTO
Series Time	(0008,0031)	TM	Auto-generated	ALWAYS	AUTO

**Table 8.1-5  
SC EQUIPMENT MODULE ATTRIBUTES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Conversion Type	(0008,0064)	CS	"DF"	ALWAYS	AUTO
Modality	(0008,0060)	CS	"OT"	ALWAYS	AUTO

**Table 8.1-6  
GENERAL IMAGE MODULE ATTRIBUTES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Instance Number	(0020,0013)	IS	Auto-generated	ALWAYS	AUTO
Patient Orientation	(0020,0020)	CS	Auto-generated	VNAP	AUTO
Content Date	(0008,0023)	DA	Auto-generated	ALWAYS	AUTO
Content Time	(0008,0033)	TM	Auto-generated	ALWAYS	AUTO

**Table 8.1-7  
IMAGE PIXEL MODULE ATTRIBUTES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Samples per Pixel	(0028,0002)	US	3	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	"RGB"	ALWAYS	AUTO
Planar Configuration	(0028,0006)	US	0	ALWAYS	AUTO
Pixel Aspect Ratio	(0028,0034)	IS	1\1	ALWAYS	AUTO
Rows	(0028,0010)	US	Auto-generated	ALWAYS	AUTO
Columns	(0028,0011)	US	Auto-generated	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	8	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	8	ALWAYS	AUTO
High Bit	(0028,0102)	US	7	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	0	ALWAYS	AUTO
Pixel Data	(7FE0,0010)	OW	Auto-generated	ALWAYS	AUTO

**Table 8.1-8  
MULTI-FRAME IMAGE MODULE ATTRIBUTES<sup>1</sup>**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Number of frames	(0028,0008)	IS	"1"	ALWAYS	AUTO

**Table 8.1-9  
SC MULTI-FRAME IMAGE MODULE ATTRIBUTES<sup>1</sup>**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Burned In Annotation	(0028,0301)	CS	"YES"	ALWAYS	AUTO
Frame Increment Pointer	(0028,0009)	AT	(0054,0080), Slice vector	ALWAYS	AUTO

<sup>1</sup> Module contents only present in Multi-frame True Color Secondary Capture Image SOP Class objects.

**Table 8.1-10  
SOP COMMON MODULE OF CREATED SC IMAGE OR SC MULTIFRAME IMAGE SOP INSTANCES**

<b>Attribute Name</b>	<b>Tag</b>	<b>VR</b>	<b>Value</b>	<b>Presence of Value</b>	<b>Source</b>
SOP Class UID	(0008,0016)	UI	"1.2.840.10008.5.1.4.1.1.7"* "1.2.840.10008.5.1.4.1.1.7.4"*	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Auto-generated	ALWAYS	AUTO
Instance Creation Date	(0008,0012)	DA	Auto-generated	ALWAYS	AUTO
Instance Creation Time	(0008,0013)	TM	Auto-generated	ALWAYS	AUTO

\* Depends on configuration file selection.



## ANNEX B. PercuNav Permitted Attributes

### B.1 PERMITTED ATTRIBUTES VALUES IN COMMON IOD

#### B.1.1 Patient Module Attributes

Attribute Name	Tag	Type	Comments
Patient's Name	(0010,0010)	2	
Patient ID	(0010,0020)	2	
Patient's Birth Date	(0010,0030)	2	
Patient's Sex	(0010,0040)	2	

#### B.1.2 General Study Module Attributes

Attribute Name	Tag	Type	Comments
Study Instance UID	(0020,000D)	1	
Study ID	(0020,0010)	2	
Study Date	(0008,0020)	2	
Study Time	(0008,0030)	2	
Accession Number	(0008,0050)	2	
Referring Physician's Name	(0008,0090)	2	
Study Description	(0008,1030)	3	

#### B.1.3 General Series Module Attributes

Attribute Name	Tag	Type	Comments
Series Date	(0008,0021)	3	
Series Time	(0008,0031)	3	
Modality	(0008,0060)	1	
Protocol Name	(0018,1030)	3	
Operators' Name	(0008,1070)	3	
Patient Position	(0018,5100)	2C	
Series Instance UID	(0020,000E)	1	
Series Number	(0020,0011)	2	

#### B.1.4 General Equipment Module Attributes

Attribute Name	Tag	Type	Comments
Manufacturer	(0008,0070)	2	
Institution Name	(0008,0080)	3	
Institution Address	(0008,0081)	3	

Attribute Name	Tag	Type	Comments
Station Name	(0008,1010)	3	
Institutional Department Name	(0008,1040)	3	
Manufacturer's Model Name	(0008,1090)	3	

### B.1.5 General Image Module Attributes

Attribute Name	Tag	Type	Comments
Instance Number	(0020,0013)	2	
Patient Orientation	(0020,0020)	2	
Series Number	(0020,0011)	2	
Patient Position	(0018,5100)	2C	

### B.1.6 General Image Plane Module Attributes

Attribute Name	Tag	Type	Comments
Pixel Spacing	(0028,0030)	1	
Image Orientation (Patient)	(0020,0037)	1	
Image Position (Patient)	(0020,0032)	1	
Slice Thickness	(0018,0050)	2	

### B.1.7 Image Pixel Module Attributes

Attribute Name	Tag	Type	Comments
Samples per Pixel	(0028,0002)	1	1
Photometric Interpretation	(0028,0004)	1	MONOCHROME2
Rows	(0028,0010)	1	
Columns	(0028,0011)	1	
Pixel Representation	(0028,0103)	1	0

Attribute Name	Tag	Type	Comments
Samples per Pixel	(0028,0002)	1	1
Photometric Interpretation	(0028,0004)	1	MONOCHROME2
Planar Configuration	(0028,0006)	1C	
Pixel Aspect Ratio	(0028,0034)	1C	
Rows	(0028,0010)	1	
Columns	(0028,0011)	1	
Bits Allocated	(0028,0100)	1	16
Bits Stored	(0028,0101)	1	12, 16
High Bit	(0028,0102)	1	

Attribute Name	Tag	Type	Comments
Pixel Representation	(0028,0103)	1	
Pixel Data	(7FE0,0010)	1C	

### B.1.8 Multi-frame module Attributes

Attribute Name	Tag	Type	Comments
Number of Frames	(0028,0008)	1	1

## B.2 PERMITTED ATTRIBUTES VALUES IN PHILIPS EBW IOD

### B.2.1 Patient Module Attributes

Attribute Name	Tag	Type	Comments
Patient's Name	(0010,0010)	2	
Patient ID	(0010,0020)	2	
Patient's Birth Date	(0010,0030)	2	
Patient's Sex	(0010,0040)	2	

### B.2.2 General Study Module Attributes

Attribute Name	Tag	Type	Comments
Study Instance UID	(0020,000D)	1	
Study ID	(0020,0010)	2	
Study Date	(0008,0020)	2	
Study Time	(0008,0030)	2	
Study Description	(0008,1030)	3	

### B.2.3 General Series Module Attributes

Attribute Name	Tag	Type	Comments
Modality	(0008,0060)	1	
Series Instance UID	(0020,000E)	1	
Series Number	(0020,0011)	2	
Patient Position	(0018,5100)	2C	

\*\*\*\*\* End of Document \*\*\*\*\*