Technical Publications

Direction LU42818
Revision 1

Achilles OsteoReport 4.0
DICOM CONFORMANCE STATEMENT

Express
Insight

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GE Medical Systems

REVISION HISTORY

REV	DATE	REASON FOR CHANGE
1	June 30, 2006	initial version

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TABLE OF CONTENTS

1. INTRODUCTION 4
1.1 OVERVIEW 4
1.2 OVERALL DICOM CONFORMANCE STATEMENT DOCUMENT STRUCTURE 5
1.3 INTENDED AUDIENCE 6
1.4 SCOPE AND FIELD OF APPLICATION 6
1.5 IMPORTANT REMARKS 7
1.6 REFERENCES 7
1.7 DEFINITIONS 8
1.8 SYMBOLS AND ABBREVIATIONS 8
2. NETWORK CONFORMANCE STATEMENT 9
2.1 INTRODUCTION 9
2.2 IMPLEMENTATION MODEL 9
2.3 AE SPECIFICATIONS 10
2.4 COMMUNICATION PROFILES 14
2.5 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS 14
2.6 CONFIGURATION 14
2.7 SUPPORT OF EXTENDED CHARACTER SETS 15
2.8 CODES AND CONTROLLED TERMINOLOGY 15
2.9 SECURITY PROFILES 15
3. SC INFORMATION OBJECT IMPLEMENTATION 16
3.1 IOD MODULE TABLE 16
3.2 INFORMATION MODULE DEFINITIONS 16
4. STORAGE COMMITMENT PUSH MODEL IMPLEMENTATION 24
4.1 STORAGE COMMITMENT PUSH MODEL INFORMATION OBJECT DEFINITION 24

1. INTRODUCTION

1.1 OVERVIEW

This DICOM Conformance Statement is divided into Sections as described below:

Section 1 (Introduction) describes the overall structure, intent, and references for this Conformance Statement

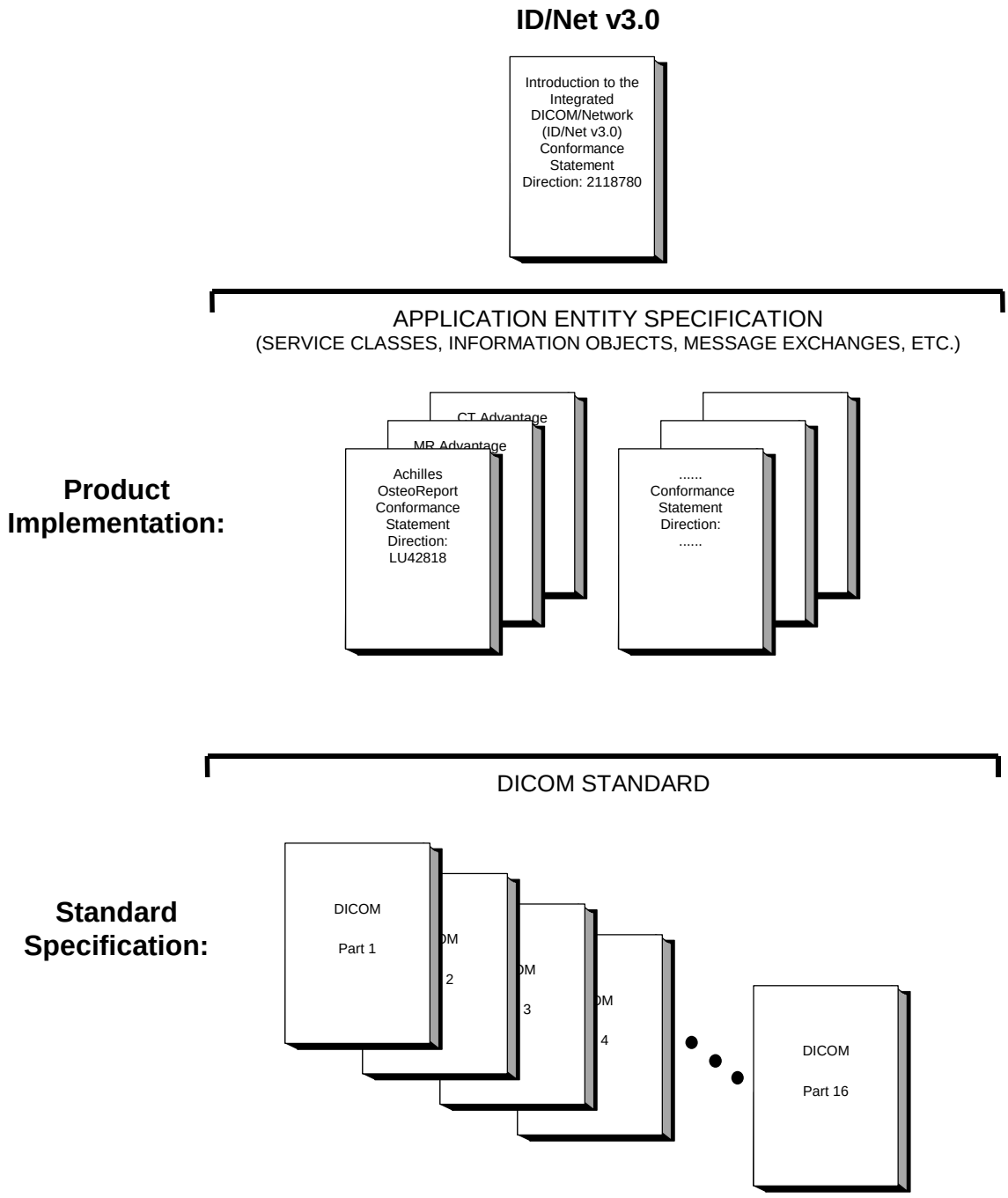
Section 2 (Network Conformance Statement) specifies the GEMS equipment compliance to the DICOM requirements for the implementation of Networking features.

Section 3 (Secondary Capture Information Object Implementation) specifies the GEMS equipment compliance to DICOM requirements for the implementation of a Secondary Capture Information Object.

Section 4 (Storage Commitment Push Model SOP Class Definition) specifies the GEMS equipment compliance to DICOM requirements for the implementation of the Storage Commitment Push Model Service.

1.2 OVERALL DICOM CONFORMANCE STATEMENT DOCUMENT STRUCTURE

The Documentation Structure of the GEMS Conformance Statements and their relationship with the DICOM v3.0 Conformance Statements is shown in the Illustration below.



This document specifies the DICOM implementation. It is entitled:

Achilles OsteoReport
DICOM Conformance Statement
Direction LU42818

This DICOM Conformance Statement documents the Technical Specification required to interoperate with the GEMS network interface. Introductory information, which is applicable to all GEMS Conformance Statements, is described in the document:

Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0)
Conformance Statement
Direction: 2118780

This Introduction familiarizes the reader with DICOM terminology and general concepts. It should be read prior to reading the individual products' GEMS Conformance Statements.

The GEMS Conformance Statement, contained in this document, also specifies the Lower Layer communications that it supports (e.g., TCP/IP). However, the Technical Specifications are defined in the DICOM Standard Part 8.

For more information including Network Architecture and basic DICOM concepts, please refer to the Introduction.

For more information regarding DICOM, copies of the Standard may be obtained on the Internet at http://medical.nema.org. Comments on the standard may be addressed to:

DICOM Secretariat
NEMA
1300 N. 17th Street, Suite 1847
Rosslyn, VA 22209
USA
Phone: +1.703.841.3200

1.3 INTENDED AUDIENCE

The reader of this document is concerned with software design and/or system integration issues. It is assumed that the reader of this document is familiar with the DICOM Standard and with the terminology and concepts that are used in that Standard.

If readers are unfamiliar with DICOM terminology they should first refer to the document listed below, then read the DICOM Standard itself, prior to reading this DICOM Conformance Statement document.

Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0)
Conformance Statement
Direction: 2118780

1.4 SCOPE AND FIELD OF APPLICATION

It is the intent of this document, in conjunction with the *Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780*, to provide an unambiguous specification for GEMS implementations. This specification, called a Conformance Statement, includes a DICOM Conformance

Statement and is necessary to ensure proper processing and interpretation of GEMS medical data exchanged using DICOM. The GEMS Conformance Statements are available to the public.

The reader of this DICOM Conformance Statement should be aware that different GEMS devices are capable of using different Information Object Definitions. For example, a GEMS CT Scanner may send images using the CT Information Object, MR Information Object, Secondary Capture Object, etc.

Included in this DICOM Conformance Statement are the Module Definitions which define all data elements used by this GEMS implementation. If the user encounters unspecified private data elements while parsing a GEMS Data Set, the user is well advised to ignore those data elements (per the DICOM Standard). Unspecified private data element information is subject to change without notice. If, however, the device is acting as a "full fidelity storage device", it should retain and re-transmit all of the private data elements which are sent by GEMS devices.

1.5 IMPORTANT REMARKS

The use of these DICOM Conformance Statements, in conjunction with the DICOM Standards is intended to facilitate communication with GE imaging equipment. However, **by itself, it is not sufficient to ensure that inter-operation will be successful**. The **user (or user's agent)** needs to proceed with caution and address at least four issues:

- **Integration** - The integration of any device into an overall system of interconnected devices goes beyond the scope of standards (DICOM), and of this introduction and associated DICOM Conformance Statements when interoperability with non-GE equipment is desired. The responsibility to analyze the applications requirements and to design a solution that integrates GE imaging equipment with non–GE systems is the **user's** responsibility and should not be underestimated. The **user** is strongly advised to ensure that such an integration analysis is correctly performed.

- **Validation** - Testing the complete range of possible interactions between any GE device and non–GE devices, before the connection is declared operational, should not be overlooked. Therefore, the **user** should ensure that any non–GE provider accepts full responsibility for all validation required for their connection with GE devices. This includes the accuracy of the image data once it has crossed the interface between the GE imaging equipment and the non–GE device and the stability of the image data for the intended applications.

  Such a validation is required before any clinical use (diagnosis and/or treatment) is performed. It applies when images acquired on GE imaging equipment are processed/displayed on a non-GE device, as well as when images acquired on non-GE equipment is processed/displayed on a GE console or workstation.

- **Future Evolution** - GE understands that the DICOM Standard will evolve to meet the user's growing requirements. GE is actively involved in the development of the DICOM Standard. DICOM will incorporate new features and technologies and GE may follow the evolution of the Standard. The GEMS protocol is based on DICOM as specified in each DICOM Conformance Statement. Evolution of the Standard may require changes to devices which have implemented DICOM. **In addition, GE reserves the right to discontinue or make changes to the support of communications features (on its products) reflected on by these DICOM Conformance Statements**. The **user** should ensure that any non–GE provider, which connects with GE devices, also plans for the future evolution of the DICOM Standard. Failure to do so will likely result in the loss of function and/or connectivity as the DICOM Standard changes and GE Products are enhanced to support these changes.

- **Interaction** - It is the sole responsibility of the **non–GE provider** to ensure that communication with the interfaced equipment does not cause degradation of GE imaging equipment performance and/or function.

1.6 REFERENCES

A list of references which is applicable to all GEMS Conformance Statements is included in the *Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780*.

1.7 DEFINITIONS

A set of definitions which is applicable to all GEMS Conformance Statements is included in *the Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780*.

1.8 SYMBOLS AND ABBREVIATIONS

A list of symbols and abbreviations which is applicable to all GEMS Conformance Statements is included in the *Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780*.

2. NETWORK CONFORMANCE STATEMENT

2.1 INTRODUCTION

This section of the DICOM Conformance Statement specifies the Achilles OsteoReport compliance to DICOM requirements for **Networking** features. Note that the format of this section strictly follows the format defined in DICOM Standard PS 3.2 (Conformance). Please refer to that part of the standard while reading this section.

Achilles OsteoReport is the GEMS software running on a commercial computer connected to an Achilles Express or Insight scanner. It allows for the following DICOM functionality:

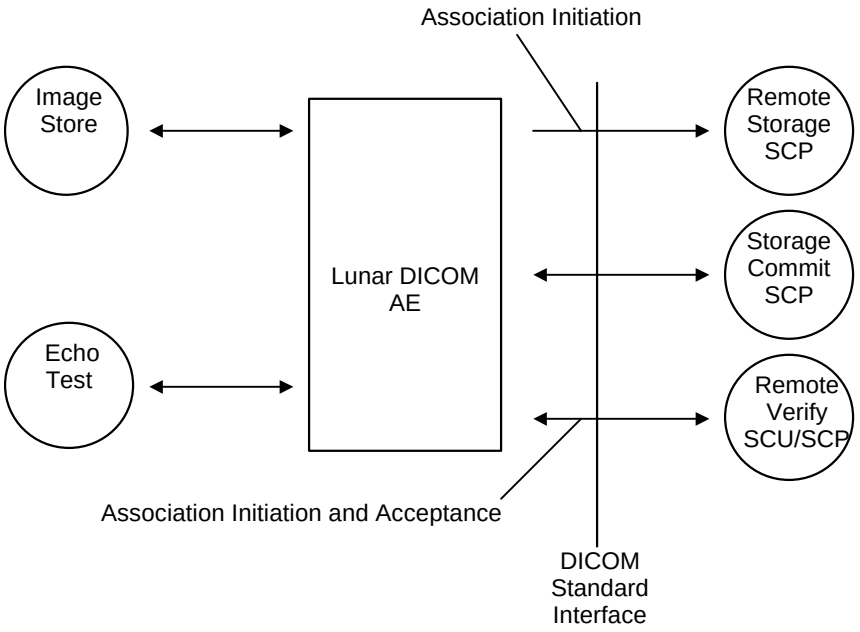
- Storing report images to a DICOM Storage SCP
- Sending storage commitment requests to a DICOM Storage Commitment SCP
- Sending and receiving Echo messages to and from a DICOM Verification SCP

2.2 IMPLEMENTATION MODEL

2.2.1 Application Data Flow Diagram

The network application model for the Achilles OsteoReport device is shown in the following illustration:

ILLUSTRATION 2–1
ACHILLES OSTEOREPORT NETWORK APPLICATION MODEL AND DATA FLOW DIAGRAM



There are two real-world activities that occur in the Achilles OsteoReport DICOM software – **Image Store** and **Echo Test**.

Image Store initiates a connection with a DICOM Storage SCP and transmits report images to the SCP. If Storage Commitment is configured, a storage commitment request will be sent for the report images. All DICOM image transfers are handled in a queued manner by the Lunar DICOM Application Entity (AE). If the network is not connected or the SCP is not running, the images will go into a holding queue. You can configure the application with multiple storage devices however there can be only one active storage device at any one time.

Echo Test initiates a connection with the DICOM Verify SCP and sends a C-ECHO message. It also responds to incoming verification requests (for service use). A verification test can be initiated at any time by the user to check the current status of any networked DICOM device.

2.2.2 Functional Definition of AEs

Achilles OsteoReport DICOM software supports one AE to store images to a storage device. The AE title defaults to "GELUNAR" however it is configurable.

2.2.3 Sequencing of Real-World Activities

Not Applicable

2.3 AE SPECIFICATIONS

2.3.1 Lunar DICOM AE Specification

The Lunar DICOM Application Entity provides Standard Conformance to the following DICOM SOP Classes as an **SCU**:

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Storage Commitment Push Model	1.2.840.10008.1.20.1

2.3.1.1 Association Establishment Policies

2.3.1.1.1 General

The DICOM Application Context Name (ACN), which is always proposed, is:

Application Context Name	1.2.840.10008.3.1.1.1

The maximum length PDU receive size for the Lunar DICOM AE is:

Maximum Length PDU	16384 bytes

2.3.1.1.2 Number of Associations

The Lunar DICOM AE will initiate a single association at a time to remote nodes.

2.3.1.1.3 Asynchronous Nature

Asynchronous mode is not supported. All operations will be performed synchronously.

2.3.1.1.4 Implementation Identifying Information

The Implementation UID for this DICOM Implementation is:

Lunar DICOM Implementation UID	1.2.840.113619.6.110

The Implementation Version Name for this DICOM Implementation is:

LUNAR DICOM Implementation Version Name	LNRDCM6.20.003

2.3.1.2 Association Initiation Policy

The Lunar DICOM AE proposes only a single Transfer Syntax in each Presentation Context; i.e., for each Abstract Syntax in the following Presentation Context Tables, the AE proposes one Presentation Context for each specified Transfer Syntax.

2.3.1.2.1 Real-World Activity Image Store

2.3.1.2.1.1 Associated Real-World Activity

Upon a request from the user, a report image will be sent (manual or automatic) to a previously configured DICOM Storage SCP. This operation also sends a storage commitment request (if so configured). The storage commitment result from the SCP is expected on a separate association.

If an error occurs during the transmission, the current association is released. A failed job can be manually retried by highlighting the queued job(s) to be retried and selecting the "Retry Selected Jobs" option off the File menu in DICOM Queue.

2.3.1.2.1.2 Proposed Presentation Context Table

Presentation Context Table – Proposed by AE Lunar DICOM for Activity Image Store					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Secondary Capture Image 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	SCU	None
Storage Commitment Push Model	1.2.840.10008.1.20.1	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

2.3.1.2.1.2.1 SOP Specific DICOM Conformance Statement for all Storage SOP Classes

Following are the status codes that are more specifically processed when receiving messages from **Storage** SCP equipment:

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes	Related Fields Processed if received
Refused	A7xx	Out of resources	Logs store failed message along with error comment returned from SCP. Displays store failure message and moves on to next job.	(0000,0902)
	A800	SOP Class not Supported	Logs store failed message along with error comment returned from SCP. Displays store failure message and moves on to next job.	(0000,0902)
Error	Cxxx	Cannot Understand	Logs store failed message along with list of offending elements and any error comments returned from SCP. Displays store failure message and moves on to next job.	(0000,0901) (0000,0902)
	A9xx	Data Set does not match SOP Class	Logs store failed message along with list of offending elements and any error comments returned from SCP. Displays store failure message and moves on to next job.	(0000,0901) (0000,0902)
	D000	Duplicate SOP Instance UID	Logs store failed message along with list of offending elements and any error comments returned from SCP. Displays store failure message and moves on to next job.	(0000,0901) (0000,0902)
Warning	B000	Coercion of Data Elements	Ignored	(0000,0901) (0000,0902)
	B007	Data Set does not match SOP Class	Ignored	(0000,0901) (0000,0902)
	B006	Elements Discarded	Ignored	(0000,0901) (0000,0902)
Success	0000			None

2.3.1.2.2 Real-World Activity Echo Test

2.3.1.2.2.1 Associated Real-World Activity

The Verification Service Class is used as a diagnostic and informative tool to provide information to the user regarding the current connection status of other networked DICOM devices. When selected by the user, the remote device will be tested with a DICOM C-ECHO command. The results of the C-ECHO are displayed on the screen. Associations will be released upon the receipt of a C-ECHO confirmation or time out in the event

that the SCP does not respond. Each networked DICOM device is verified individually. The table below lists all possible proposed SOP classes when a verification association is opened.

2.3.1.2.2.2 Proposed Presentation Context Table

Presentation Context Table – Proposed by AE Lunar DICOM for Activity Echo Test					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended**
Name	**UID**	**Name List**	**UID List**		**Negotiation**
Verification SOP Class	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
Secondary Capture Image 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	SCU	None
Storage Commitment Push	1.2.840.10008.1.20.1	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

2.3.1.3 Association Acceptance Policy

2.3.1.3.1 Real-World Activity Image Storage Commitment

2.3.1.3.1.1 Associated Real-World Activity

An incoming Storage Commitment Result Request will cause the Lunar DICOM AE to accept the association and respond with an appropriate response.

2.3.1.3.1.2 Accepted Presentation Context Table

Presentation Context Table – Accepted by AE Lunar DICOM for Activity Image Store Commit					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended**
Name	**UID**	**Name List**	**UID List**		**Negotiation**
Storage Commitment Push Model	1.2.840.10008.1.20.1	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

2.3.1.3.1.2.1 SOP Specific DICOM Conformance Statement for the Storage Commitment Push Model SOP Class

The Lunar DICOM AE will only accept the SCU role (which must be proposed via SCP/SCU Role Selection Negotiation) within a Presentation Context for the Storage Commitment Push Model SOP Class.

Upon receiving a Storage Commitment N-EVENT-REPORT (Storage Commitment Result), the Lunar DICOM AE will return a Success status.

2.3.1.3.1.3 Presentation Context Acceptance Criterion

No criterion.

2.3.1.3.1.4 Transfer Syntax Selection Policies

The selected transfer syntax is based on the proposed transfer syntax list. The priority order is Implicit VR Little Endian, Explicit VR Little Endian, Explicit VR Big Endian.

2.4 COMMUNICATION PROFILES

2.4.1 Supported Communication Stacks

The DICOM Upper Layer Protocol is supported using TCP/IP, as specified in DICOM PS3.8.

The TCP/IP stack is inherited from the Windows Operating System.

2.4.2 Physical Media Support

The product is provided with a 10/100Mb/s auto-sensing Ethernet interface. Additional or alternate network interfaces may be available.

2.5 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

2.5.1 Standard Extended /Specialized/Private SOPs

None.

2.6 CONFIGURATION

2.6.1 AE Title/Presentation Address Mapping

The local AE title is configurable and is normally setup by a GEMS service engineer during DICOM software installation. It can be modified by the user if the need arises.

2.6.2 Configurable Parameters

The following fields are configurable for this AE (local):

- Local AE Title (default is GELUNAR)
- Local IP Address
- Local IP Netmask
- Local Modality (default is OT)
- Association Establishment Timer (default is 30 sec)
- Maximum Length PDU (default is 16384)
- Read Timeout (default is 15 sec)
- Write Timeout (default is 15 sec)

- Storage Commitment port (default is 2800).

The following fields are configurable for every remote DICOM AE:

- Remote AE Title
- Remote IP Address
- Listening TCP/IP Port Number (default is 104)
- RGB, palette color, or monochrome images (default is palette color)

2.7 SUPPORT OF EXTENDED CHARACTER SETS

No extended character sets supported.

2.8 CODES AND CONTROLLED TERMINOLOGY

2.8.1 Fixed Coded Terminology

Not applicable.

2.8.2 Mapped Coded Terminology

Not applicable.

2.8.3 Configurable Coded Terminology

Nott applicable.

2.9 SECURITY PROFILES

The product does not conform to any defined DICOM Security Profiles.

It is assumed that the product is used within a secured environment. It is assumed that a secured environment includes at a minimum:

1. Firewall or router protections to ensure that only approved external hosts have network access to the product.
2. Firewall or router protections to ensure that the product only has network access to approved external hosts and services.
3. Any communications with external hosts and services outside the locally secured environment use appropriate secure network channels (such as a Virtual Private Network (VPN))

3. SC INFORMATION OBJECT IMPLEMENTATION

3.1 IOD MODULE TABLE

The Secondary Capture Information Object Definition comprises the modules of the following table, plus Standard Extended and Private attributs. Common modules are described in section

TABLE 3.1-1
SC IMAGE IOD MODULES

Entity Name	Module Name	Usage	Reference
Patient	Patient	Used	3.2.1.1
Study	General Study	Used	3.2.2.1
	Patient Study	Used	3.2.2.2
Series	General Series	Used	3.2.3.1
Equipment	General Equipment	Used	3.2.4.1
	SC Equipment	Used	3.2.7.1
Image	General Image	Used	3.2.5.1
	Image Pixel	Used	3.2.5.2
	SC Image	Used	3.2.7.2
	Overlay Plane	Not Used	
	Modality LUT	Not Used	
	VOI LUT	Not Used	
	SOP Common	Used	3.2.6.1

3.2 INFORMATION MODULE DEFINITIONS

Please refer to DICOM v3.0 Standard Part 3 (Information Object Definitions) for a description of each of the entities and modules contained within the SC Information Object.

The following modules are included to convey Enumerated Values, Defined Terms, and Optional Attributes supported. Type 1 & Type 2 Attributes are also included for completeness and to define what values they may take and where these values are obtained from. It should be noted that they are the same ones as defined in the DICOM Standard Part 3 (Information Object Definitions).

3.2.1 Common Patient Entity Modules

3.2.1.1 Patient Module

This section specifies the Attributes of the Patient that describe and identify the Patient who is the subject of a diagnostic Study. This Module contains Attributes of the patient that are needed for diagnostic interpretation of the Image and are common for all studies performed on the patient.

TABLE 3.2-1
PATIENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Patient's Name	(0010,0010)	2	Patient name from user interface.
Patient ID	(0010,0020)	2	Patient ID from user interface.
Patient's Birth Date	(0010,0030)	2	Patient birth date from user interface.
Patient's Sex	(0010,0040)	2	Patient sex from user interface.
Referenced Patient Sequence	(0008,1120)	3	Not used
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Patient's Birth Time	(0010,0032)	3	Not used
Other Patient Ids	(0010,1000)	3	Not used
Other Patient Names	(0010,1001)	3	Not used
Ethnic Group	(0010,2160)	3	Ethnic from user interface.
Patient Comments	(0010,4000)	3	Comment from user interface.

3.2.2 Common Study Entity Modules

The following Study IE Modules are common to all Composite Image IODs which reference the Study IE. These Modules contain Attributes of the patient and study that are needed for diagnostic interpretation of the image.

3.2.2.1 General Study Module

This section specifies the Attributes which describe and identify the Study performed upon the Patient.

TABLE 3.2-2
GENERAL STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Study Instance UID	(0020,000D)	1	Uniquely identifies a study. Internally generated.
Study Date	(0008,0020)	2	Date of exam.
Study Time	(0008,0030)	2	Time of exam.
Referring Physician's Name	(0008,0090)	2	Doctor from user interface.
Study ID	(0020,0010)	2	Not used. Sent as zero length.
Accession Number	(0008,0050)	2	Not used. Sent as zero length.
Study Description	(0008,1030)	3	Not used
Physician(s) of Record	(0008,1048)	3	Not used
Name of Physician(s) Reading Study	(0008,1060)	3	Not used
Referenced Study Sequence	(0008,1110)	3	Not used
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	

3.2.2.2 Patient Study Module

This section defines Attributes that provide information about the Patient at the time the Study was performed.

TABLE 3.2-3
PATIENT STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Admitting Diagnoses Description	(0008,1080)	3	Not used.
Patient's Age	(0010,1010)	3	Patient age in years at time of exam as calculated from DOB entered from user interface.
Patient's Size	(0010,1020)	3	Patient height from user interface.
Patient's Weight	(0010,1030)	3	Patient weight from user interface.
Occupation	(0010,2180)	3	Not used.
Additional Patient History	(0010,21B0)	3	Not used.

3.2.3 Common Series Entity Modules

The following Series IE Modules are common to all Composite Image IODs which reference the Series IE.

3.2.3.1 General Series Module

This section specifies the Attributes which identify and describe general information about the Series within a Study.

TABLE 3.2-4
GENERAL SERIES MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Modality	(0008,0060)	1	Configurable. Default is 'OT'= Other.
Series Instance UID	(0020,000E)	1	Uniquely identifies a series of images within a study. Internally generated.
Series Number	(0020,0011)	2	Internal value which is incremented for each series within a study.
Laterality	(0020,0060)	2C	Not used.
Series Date	(0008,0021)	3	Not used.
Series Time	(0008,0031)	3	Not used.
Performing Physicians' Name	(0008,1050)	3	Not used.
Protocol Name	(0018,1030)	3	Left/Right Foot.
Series Description	(0008,103E)	3	Not used.
Operators' Name	(0008,1070)	3	Not used.
Referenced Study Component Sequence	(0008,1111)	3	Not used.
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Body Part Examined	(0018,0015)	3	Not used
Patient Position	(0018,5100)	2C	Not used. Sent as zero length.
Smallest Pixel Value in Series	(0028,0108)	3	Not used
Largest Pixel Value in Series	(0028,0109)	3	Not used
Requested Attribute Sequence	(0040,0275)	3	Not used.
>Requested Procedure ID	(0040,1001)	1C	
>Scheduled Procedure Step ID	(0040, 0009)	1C	
>Scheduled Procedure Step Description	(0040, 0007)	3	
>Scheduled Protocol Code Sequence	(0040,0008)	3	
>>Code Value	(0008,0100)	1C	
>>Coding Scheme Designator	(0008,0102)	1C	
>>Coding Scheme Version	(0008,0103)	1C	
>>Code Meaning	(0008,0104)	1C	
Performed Procedure Step ID	(0040,0253)	3	Not used.
Performed Procedure Step Start Date	(0040,0244)	3	Date of exam.
Performed Procedure Step Start Time	(0040,0245)	3	Time of exam.

Performed Procedure Step Description	(0040,0254)	3	Left/Right Foot.
Performed Action Item Sequence	(0040,0260)	3	Not used.

3.2.4 Common Equipment Entity Modules

The following Equipment IE Module is common to all Composite Image IODs which reference the Equipment IE.

3.2.4.1 General Equipment Module

This section specifies the Attributes which identify and describe the piece of equipment which produced a Series of Images.

TABLE 3.2-5
GENERAL EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Manufacturer	(0008,0070)	2	'GE Healthcare'
Institution Name	(0008,0080)	3	Not used.
Institution Address	(0008,0081)	3	Not used.
Station Name	(0008,1010)	3	Name of PC used.
Institutional Department Name	(0008,1040)	3	Not used.
Manufacturer's Model Name	(0008,1090)	3	Not used.
Device Serial Number	(0018,1000)	3	Device system number.
Software Versions	(0018,1020)	3	Version of software image acquired with.
Spatial Resolution	(0018,1050)	3	Not used
Date of Last Calibration	(0018,1200)	3	Not used
Time of Last Calibration	(0018,1201)	3	Not used
Pixel Padding Value	(0028,0120)	3	Not used

3.2.5 Common Image Entity Modules

The following Image IE Modules are common to all Composite Image IODs which reference the Image IE.

3.2.5.1 General Image Module

This section specifies the Attributes which identify and describe an image within a particular series.

TABLE 3.2-6
GENERAL IMAGE MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Image Number	(0020,0013)	2	Internal value which is incremented for each image within a study series.
Patient Orientation	(0020,0020)	2C	Patient direction of the rows and columns of the image (if applicable).
Image Date	(0008,0023)	2C	Not sent since images not temporally related.
Image Time	(0008,0033)	2C	Not sent since images not temporally related.

Image Type	(0008,0008)	3	Not used
Acquisition Number	(0020,0012)	3	Not used
Acquisition Date	(0008,0022)	3	Date image was acquired.
Acquisition Time	(0008,0032)	3	Time image was acquired.
Referenced Image Sequence	(0008,1140)	3	Not used
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Derivation Description	(0008,2111)	3	Not used
Source Image Sequence	(0008,2112)	3	Not used
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Images in Acquisition	(0020,1002)	3	Not used
Image Comments	(0020,4000)	3	Encoded ultrasonometer results (configurable).
Lossy Image Compression	(0028,2110)	3	Not used

3.2.5.1.1 General Image Attribute Descriptions

3.2.5.2 Image Pixel Module

This section specifies the Attributes that describe the pixel data of the image.

TABLE 3.2-7
IMAGE PIXEL MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Samples per Pixel	(0028,0002)	1	Value of '1' when photometric interpretation = 'PALETTE COLOR' or 'MONOCHROME2'. Value of '3' when photometric interpretation = 'RGB'.
Photometric Interpretation	(0028,0004)	1	'RGB', 'PALETTE COLOR' or 'MONOCHROME2'
Rows	(0028,0010)	1	Number of rows in the image
Columns	(0028,0011)	1	Number of columns in the image.
Bits Allocated	(0028,0100)	1	Value always = 0008H.
Bits Stored	(0028,0101)	1	Value always = 0008H.
High Bit	(0028,0102)	1	Value always = 0007H.
Pixel Representation	(0028,0103)	1	Value always = 0000H (unsigned integer).
Pixel Data	(7FE0,0010)	1	
Planar Configuration	(0028,0006)	1C	Value of 0000H (color-by-pixel) for RGB images.
Pixel Aspect Ratio	(0028,0034)	1C	Not sent since aspect ratio always 1\1.
Smallest Image Pixel Value	(0028,0106)	3	Not used

Largest Image Pixel Value	(0028,0107)	3	Not used
Red Palette Color Lookup Table Descriptor	(0028,1101)	1C	Only used if photometric interpretation = PALETTE COLOR.
Green Palette Color Lookup Table Descriptor	(0028,1102)	1C	Only used if photometric interpretation = PALETTE COLOR.
Blue Palette Color Lookup Table Descriptor	(0028,1103)	1C	Only used if photometric interpretation = PALETTE COLOR.
Red Palette Color Lookup Table Data	(0028,1201)	1C	Only used if photometric interpretation = PALETTE COLOR.
Green Palette Color Lookup Table Data	(0028,1202)	1C	Only used if photometric interpretation = PALETTE COLOR.
Blue Palette Color Lookup Table Data	(0028,1203)	1C	Only used if photometric interpretation = PALETTE COLOR.

3.2.6 General Modules

The SOP Common Module is mandatory for all DICOM IODs.

3.2.6.1 SOP Common Module

This section defines the Attributes which are required for proper functioning and identification of the associated SOP Instances. They do not specify any semantics about the Real-World Object represented by the IOD.

TABLE 3.2-8
SOP COMMON MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
SOP Class UID	(0008,0016)	1	1.2.840.10008.5.1.4.1.1.7
SOP Instance UID	(0008,0018)	1	Uniquely identifies an image. Internally generated.
Specific Character Set	(0008,0005)	1C	Not used, as expanded or replacement character sets are not used.
Instance Creation Date	(0008,0012)	3	Not used
Instance Creation Time	(0008,0013)	3	Not used
Instance Creator UID	(0008,0014)	3	Not used

3.2.7 SC Modules

This Section describes SC Equipment, and Image Modules. These Modules contain Attributes that are specific to SC Image IOD.

3.2.7.1 SC Equipment Module

This Module describes equipment used to convert images into a DICOM format.

TABLE 3.2-9
SC IMAGE EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Conversion Type	(0008,0064)	1	'WSD' = Workstation.
Modality	(0008,0060)	3	Not used
Secondary Capture Device ID	(0018,1010)	3	Not used
Secondary Capture Device Manufacturer	(0018,1016)	3	Not used
Secondary Capture Device Manufacturer's Model Name	(0018,1018)	3	Not used
Secondary Capture Device Software Version	(0018,1019)	3	Software version report was created with.
Video Image Format Acquired	(0018,1022)	3	Not used
Digital Image Format Acquired	(0018,1023)	3	Not used

3.2.7.2 SC Image Module

The table in this Section contains IOD Attributes that describe SC images.

TABLE 3.2-10
SC IMAGE MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Date of Secondary Capture	(0018,1012)	3	Date report image was created.
Time of Secondary Capture	(0018,1014)	3	Time report image was created.

4. STORAGE COMMITMENT PUSH MODEL IMPLEMENTATION

4.1 STORAGE COMMITMENT PUSH MODEL INFORMATION OBJECT DEFINITION

Please refer to DICOM Part 3 (Information Object Definitions) for a description of each of the attributes contained within the Storage Commitment Information Object.

The Storage Commitment Information Object is used both for N-ACTION Storage Commitment Requests by the SCU and N-EVENT-REPORT Storage Commitment Notifications by the SCP.

4.1.1 Storage Commitment Request

The Storage Commitment Request operation allows an SCU to request an SCP to commit to the safekeeping of a set of SOP Instances.

Lunar DICOM sends a Storage Commitment Request after a successful Store Request to a DICOM storage SCP.

If an N-ACTION response error status code is received from the SCP, a failure message will be logged and the failed job placed in a holding queue. A failed job can be manually retried by highlighting the queued job(s) to be retried and selecting the "Retry Selected Jobs" option off the DICOM Queue File menu.

4.1.2 STORAGE COMMITMENT MODULE FOR N-ACTION

TABLE 4.1-1
STORAGE COMMITMENT MODULE FOR N-ACTION

Attribute Name	Tag	SCU Use
Transaction UID	(0008,1195)	Internally generated number
Storage Media File-Set ID	(0088,0130)	Not used
Storage Media File-Set UID	(0088,0140)	Not used
Referenced SOP Sequence	(0008,1199)	Supported
>Referenced SOP Class UID	(0008,1150)	Supported
>Referenced SOP Instance UID	(0008,1155)	Supported
>Storage Media File-Set ID	(0088,0130)	Not used
>Storage Media File-Set UID	(0088,0140)	Not used

4.1.3 Storage Commitment Result

The Storage Commitment Result notification allows an SCP to inform the SCU whether or not it has accepted storage commitment responsibility for the SOP instances referenced by a Storage Commitment Request.

4.1.4 STORAGE COMMITMENT MODULE FOR N-EVENT-REPORT

TABLE 4.1-1
STORAGE COMMITMENT MODULE FOR N-EVENT-REPORT

Attribute Name	Tag	SCU Use
Transaction UID	(0008,1195)	Supported
Retrieve AE Title	(0008,0054)	Not used
Storage Media File-Set ID	(0088,0130)	Not used
Storage Media File-Set UID	(0088,0140)	Not used
Referenced SOP Sequence	(0008,1199)	Supported
>Referenced SOP Class UID	(0008,1150)	Supported
>Referenced SOP Instance UID	(0008,1155)	Supported
>Retrieve AE Title	(0008,0054)	Not used
>Storage Media File-Set ID	(0088,0130)	Not used
>Storage Media File-Set UID	(0088,0140)	Not used
Failed SOP Sequence	(0008,1198)	Supported
>Referenced SOP Class UID	(0008,1150)	Supported
>Referenced SOP Instance UID	(0008,1155)	Supported
>Failure Reason	(0008,1197)	Supported