



Technical Publications

**Direction 1007228
Revision 0**

Navigation Plus System Version 5.2 CONFORMANCE STATEMENT For DICOM

Copyright© 2004 by General Electric Co.

Do not duplicate

THIS PAGE LEFT INTENTIONALLY BLANK

REVISION HISTORY

Rev	Date	Reason for change
0		Creation

THIS PAGE LEFT INTENTIONALLY BLANK

TABLE OF CONTENTS

1. INTRODUCTION	1-1
1.1 OVERVIEW.....	1-1
1.2 OVERALL DICOM CONFORMANCE STATEMENT DOCUMENT STRUCTURE.....	1-2
1.3 INTENDED AUDIENCE.....	1-3
1.4 SCOPE AND FIELD OF APPLICATION.....	1-4
1.5 IMPORTANT REMARKS	1-4
1.6 REFERENCES	1-5
1.7 DEFINITIONS.....	1-5
1.8 SYMBOLS AND ABBREVIATIONS.....	1-5
2. NETWORK CONFORMANCE STATEMENT	2-1
2.1 INTRODUCTION	2-1
2.2 IMPLEMENTATION MODEL	2-1
2.3 AE SPECIFICATIONS.....	2-3
2.4 COMMUNICATION PROFILES.....	2-8
2.5 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS	2-8
2.6 CONFIGURATION	2-9
2.7 SUPPORT OF EXTENDED CHARACTER SETS.....	2-9
2.8 CODES AND CONTROLLED TERMINOLOGY	2-9
2.9 SECURITY PROFILES.....	2-9
3. MEDIA STORAGE CONFORMANCE STATEMENT	3-1
3.1 INTRODUCTION	3-1
3.2 IMPLEMENTATION MODEL	3-1
3.3 AE SPECIFICATIONS.....	3-4
3.4 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS	3-7

3.5 CONFIGURATION 3-7

3.6 SUPPORT OF EXTENDED CHARACTER SETS..... 3-8

1. INTRODUCTION

1.1 OVERVIEW

This DICOM Conformance statement covers the following Navigation Systems: InstaTrak Plus, ENTrak Plus, ConneCTstat Plus and FluoroTrak Plus. Throughout the document these systems will be collectively referred to as Navigation Plus systems.

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

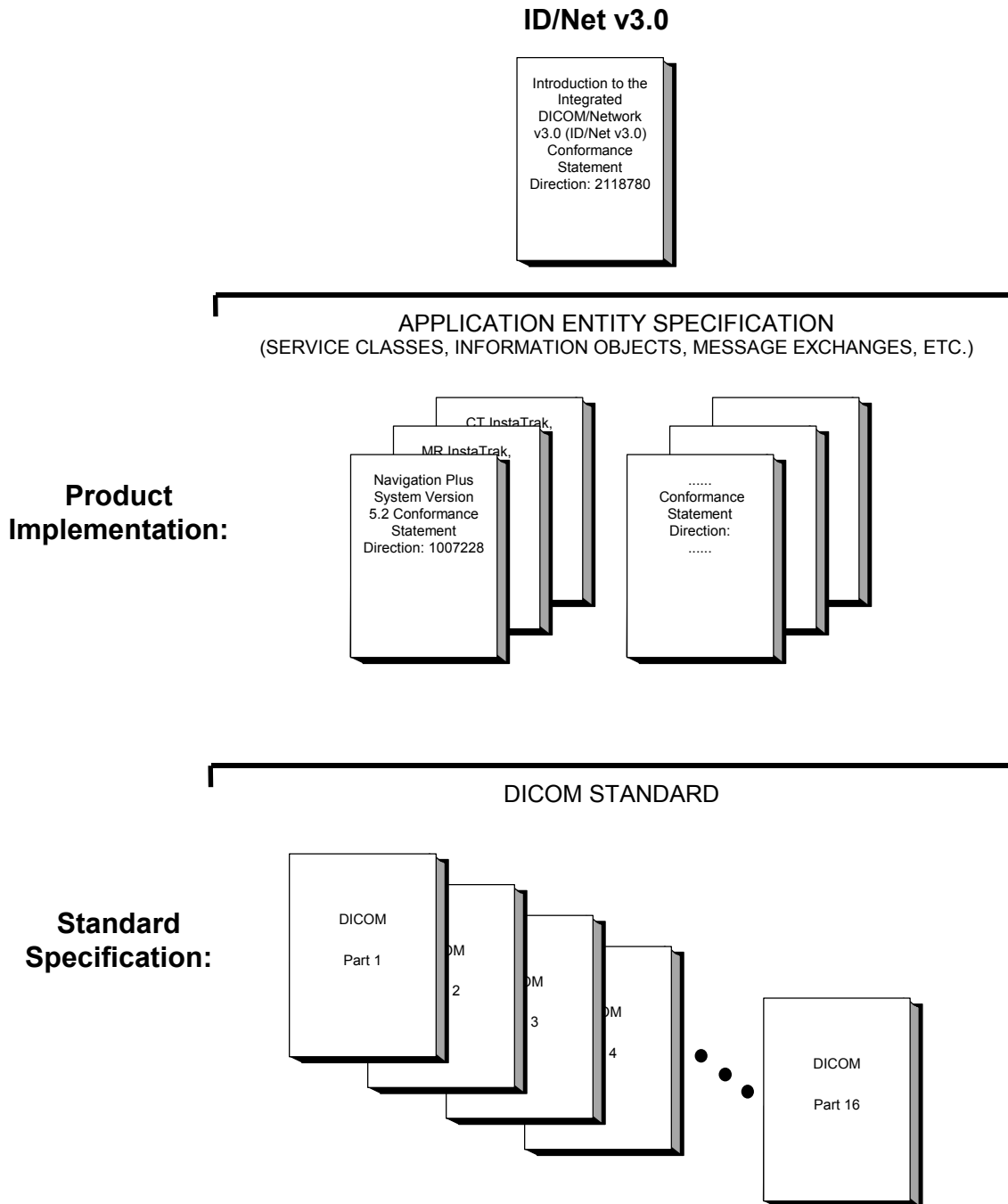
Section 1 (Introduction), which describes the overall structure, intent, and references for this Conformance Statement

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

Section 3 (Media Storage Conformance Statement), which specifies the GEHC equipment compliance to the DICOM requirements for the implementation of Media Storage features.

1.2 OVERALL DICOM CONFORMANCE STATEMENT DOCUMENT STRUCTURE

The Documentation Structure of the GEHC Conformance Statements and their relationship with the DICOM Conformance Statements is shown in the below.



This document specifies the DICOM implementation. It is entitled:

Navigation Plus System Version 5.2
Conformance Statement for DICOM
Direction 1007228

This DICOM Conformance Statement documents the DICOM Conformance Statement and Technical Specification required to interoperate with the GEHC network interface. Introductory information, which is applicable to all GEHC 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' GEHC Conformance Statements.

The GEHC 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 Part 8 standard.

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 which 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 GEHC implementations. This specification, called a Conformance Statement, includes a DICOM Conformance Statement and is necessary to ensure proper processing and interpretation of GEHC medical data exchanged using DICOM. The GEHC Conformance Statements are available to the public.

The reader of this DICOM Conformance Statement should be aware that different GEHC devices are capable of using different Information Object Definitions. For example, a GEHC 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 that define all data elements used by this GEHC implementation. If the user encounters unspecified private data elements while parsing a GEHC 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 that are sent by GEHC 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 GEHC 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) described 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 that is applicable to all GEHC 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 GEHC 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 GEHC 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 compliance to DICOM conformance requirements for the relevant **Networking** features on this GEHC product. The Navigation Plus systems utilize DICOM services to both receive and transfer DICOM data from other compliant DICOM entities over a network.

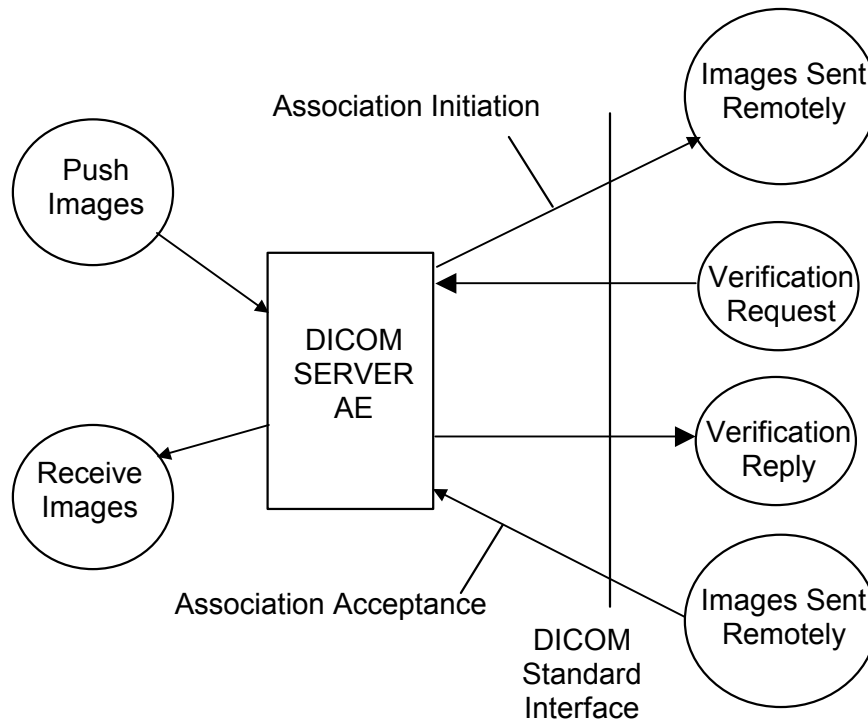
Note that the format of this section strictly follows the format defined in DICOM Standard PS 3.2 (Conformance). Please refer to that part of the standard while reading this section.

2.2 IMPLEMENTATION MODEL

2.2.1 Application Data Flow Diagram

The network application model for the Navigation Plus systems is shown in the following Illustration:

ILLUSTRATION 2-1
NAVIGATION PLUS NETWORK APPLICATION MODEL AND DATA FLOW DIAGRAM



The DICOM SERVER Application Entity (AE) is an application that handles DICOM protocol communication. The DICOM SERVER AE is automatically brought up when the Navigation Plus system is powered on and the main application is started.

All remote DICOM entities must be manually entered on the Navigation system by an operator or a field engineer.

The DICOM SERVER AE is invoked by the following Real World Activities:

- Manual Transmit Series from the Navigation system to a Remote Host

For this operation, the operator selects a series from the system's patient database window and then sends the selected series to a remote DICOM AE by selecting the host name from a pull down menu of configured remote hosts. This menu is accessed by the "Send Data To..." button located on the patient database window and choosing the Network as the data destination.

The declaration of the remote host is done through the Network Configuration window that can be accessed through the System Administration menu. The Network Configuration window is used to configure the local host and define remote entities.

The status of the transfer is displayed on the status bar of the patient database window. Any error in transfer is communicated to the user through a pop-up message indicating the nature of the error.

Only one series at a time may be selected for network transfer, but additional transfers can be initiated while another data set is being transferred. The series information will be held in a buffer and the additional transfer requests will be executed in the order that they were initiated as each previous transfer is completed.

- Receive images from a Remote DICOM AE.

The Navigation Plus system will only accept DICOM transfers from a host that is known to the system. The list of known hosts is displayed in the Network Configuration window accessible through the System Administration menu. This window will display a list of all known hosts and shows their network status as Alive or Unreachable. This window will allow an operator to enter additional remote hosts as well as update configuration of the local host.

When images are installed in the local database, they are displayed in the Patient Database window. Unsupported modalities will not be displayed. These files are classified as unusable by the application and are placed in a folder on the system marked unusable. If unusable files exist on the system, a single entry will exist in the patient database stating the amount of unusable files in MB that are present on the system.

2.2.2 Functional Definition of AE's

The DICOM SERVER AE initiates the following operations:

- Initiate a DICOM association to send DICOM SOP Classes to a remote DICOM AE.

The DICOM SERVER AE waits for association request from Remote AE:

- Answer to DICOM associations transmitting DICOM SOP Classes to be stored on the navigation system.
- Answer to DICOM associations transmitting Verification SOP Class to the navigation system.

2.2.3 Sequencing of Real-World Activities

Not Applicable

2.3 AE SPECIFICATIONS

2.3.1 DICOM SERVER AE Specification

The DICOM SERVER AE provides Standard Conformance to the following DICOM SOP Classes as an SCU:

SOP Class Name	SOP Class UID
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
MR Image Storage	1.2.840.10008.5.1.4.1.1.4

This Application Entity provides Standard Conformance to the following DICOM SOP Classes as an SCP:

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
MR Image Storage	1.2.840.10008.5.1.4.1.1.4

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 DICOM SERVER AE is:

Maximum Length PDU	28672 bytes
---------------------------	--------------------

2.3.1.1.2 Number of Associations

The DICOM SERVER AE will initiate a maximum of one association at a time to remote nodes.

The DICOM SERVER AE will support a maximum of five simultaneous associations initiated by 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:

Navigation Plus System Version 5.2	1.2.840.113619.6.180
---	-----------------------------

2.3.1.2 Association Initiation Policy

When the DICOM SERVER Application Entity initiates an Association for any Real-World Activity, it will propose the Presentation Contexts for all Real-World Activities; i.e., there is only a single, comprehensive Presentation Context Negotiation proposed for the AE.

The DICOM SERVER 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: Push Series to Remote AE

2.3.1.2.1.1 Associated Real-World Activity

The operator selects in the Patient Database one of the data series to be sent. The user can then click on the “Send Data To...” button. This will present the user with a dialog where they can select the network as the data destination; this will enable a drop down menu of all the known remote DICOM hosts.

This operation will cause:

- The DICOM SERVER AE to initiate a DICOM association; negotiate with the Remote AE an appropriate Abstract and Transfer Syntax.
- To emit C-STORE command to send the image, if the negotiation is successful.

2.3.1.2.1.2 Proposed Presentation Context Table

Presentation Context Table – Proposed					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

In addition to CT Image Storage and MR Image Storage classes, there are also internally produced modalities SEG, CMD and FCT. The following describes each of these modalities:

SEG – Segmentation data. This is the modality that segmented information is saved as. The segmented image data is equivalent to the data from which it originated except with altered pixel data. If the segmented data was created from an MRI image, the image will have all the UID and header information of the MRI it came from, but with a unique SOP Instance UID. An association exists between a segmented data set and the original data it was created from. If a data transfer of the source data is initiated, the associated segmentation data will also be transferred automatically.

CMD – Cortical Mapping Data. This is the modality that Cortical Mapping information is saved as. The cortical mapping image shares the UID and header information of the source data. If the cortical mapping data was created from an MRI image, the image will have all the UID and header information of the MRI it came from. There is no pixel data present in the cortical mapping data file. The cortical mapping information will be stored in the private tag (05E3, 1000). An association exists between cortical mapping data and the original data it was created from. If a data transfer of the source data is initiated, the associated cortical mapping data will also be transferred automatically.

FCT – FluoroCAT Reconstruction. This is the modality that a 3D reconstruction from Fluoroscope images is saved as. This image type is equivalent to the CT Image Storage class and uses the same UID and header information as a CT image. The reconstructed image data is written to the pixel data field.

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 a **Storage** SCP equipment:

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
Failure	A7xx	Refused: Out of resources	Association is closed with Remote AE Failure message is displayed to the user.

	A9xx	Error: Data Set does not match SOP Class	Association is closed with Remote AE Failure message is displayed to the user.
	Cxxx	Error: Cannot Understand	Association is closed with Remote AE Failure message is displayed to the user.
	0110	Error: Failure processing	Association is closed with Remote AE Failure message is displayed to the user.
Warning	B000	Coercion of Data Elements	Association is not closed with Remote AE General warning message logged.
	B006	Elements Discarded	Association is not closed with Remote AE General warning message is logged.
	B007	Data Set does not match SOP Class	Association is not closed with Remote AE General warning message is logged.
Success	0000		

2.3.1.3 Association Acceptance Policy

2.3.1.3.1 Real-World Activity: “Image Installation”

The DICOM SERVER AE accepts an association when it receives a valid association request from a DICOM Storage SCU. The Navigation Plus system will only accept requests from remote entities that are known to the system. This means that the remote host must be in the list of known DICOM providers in the Network Configuration dialog accessible through the System Administration menu.

2.3.1.3.1.1 Associated Real-World Activity

The DICOM SERVER AE waits for any association. No operator action is required to receive an image.

2.3.1.3.1.2 Accepted Presentation Context Table

Presentation Context Table – Proposed					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

2.3.1.3.1.2.1 SOP Specific DICOM Conformance Statement for All Storage SOP Classes

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

Service Status	Status Code	Further Meaning	Status Code sending explanation
Error	0110	Error: Failure processing	Indicates that an internal system call has failed while processing the image.
Success	0000		

Image Reception Phase:

- If the DICOM Server AE fails to parse the received image, the error 110(Processing Failure) is returned to the C-STORE SCU.

When a C-STORE operation is returned Successful to the C-STORE SCU, the image has been written to the disk. The images will then appear in the Patient Database grouped by unique series. Unsupported modalities will show up in the Patient Database in the Unusable files category.

Image Declaration Phase:

After receiving data, images of known modalities will appear in the Patient Database grouped by unique series. Unsupported modalities will show up in the Patient Database in the Unusable files category.

Images of known modalities will be rejected and classified as Unusable if any of the following conditions exist in the received image data:

- Image Rows(0028,0010) OR Image Columns(0028,0011) tags are missing or are less than or equal to 0.
- Reconstruction Diameter(0018,0090) OR Pixel Spacing(0028,0030) is missing or equals 0.

Note : All the images will be installed with the same elements in which it was received.

2.3.1.3.1.3 Presentation Context Acceptance Criterion

Only known SOP Classes are accepted.

2.3.1.3.1.4 Presentation Context Acceptance Criterion

The default transfer syntax for SOP Classes is always chosen (Implicit VR Little Endian:1.2.840.10008.1.2).

2.3.1.3.2 Real-World Activity: “Verification Acceptance”

2.3.1.3.2.1 Associated Real-World Activity

The Navigation Plus system will respond to verification requests made by remote systems.

2.3.1.3.2.2 Accepted Presentation Context Table

Presentation Context Table – Proposed					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

2.3.1.3.2.2.1 SOP Specific DICOM Conformance Statement for SOP Class Verification

The DICOM Server AE provides standard conformance.

2.3.1.3.2.2.2 Presentation Context Acceptance Criterion

There are no specific rules for acceptance and prioritization of presentation contexts and the DICOM Server AE will accept all presentation contexts that match those listed in the table shown above.

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 Linux Operating System.

2.4.2 Physical Media Support

DICOM is indifferent to the Physical medium over which TCP/IP executes (e.g. Ethernet, V2.0, IEEE 802.3, ATM, FDDI, Ethernet 100Mb).

Note: For more information about the Physical Media available on the Navigation Plus system, please refer to the Product Data Sheet.

2.5 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

2.5.1 Standard Extended / Specialized / Private SOP Classes

2.5.1.1 Standard Extended SOP Classes

Not applicable.

2.5.2 Private Transfer Syntaxes

No private Transfer Syntaxes are negotiated.

2.6 CONFIGURATION

2.6.1 AE Title/Presentation Address Mapping

The Local AE Title is configurable. This can be viewed and configured from the Network Configuration dialog accessible from the System Administration menu.

2.6.2 Configurable Parameters

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

- Local AE Title
- Local IP Address
- Local Host name
- Local Listening Port Number
- Local IP Netmask

The following fields are configurable for every remote DICOM AE:

- Remote IP Address
- Remote Host name

2.7 SUPPORT OF EXTENDED CHARACTER SETS

No extended character sets are supported.

2.8 CODES AND CONTROLLED TERMINOLOGY

The product uses no coded terminology.

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.

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. MEDIA STORAGE CONFORMANCE STATEMENT

3.1 INTRODUCTION

This section of the DICOM conformance statement specifies the Navigation system compliance to DICOM requirements for **Media Interchange**. It details the DICOM Media Storage Application Profiles and roles that are supported by this product.

This system provides capabilities to DICOM interchange on CD-Rs (Compact Disc-Recordable) and on CDROMs (Compact Disc Read Only Memory). The Navigation system works with mainly with Computed Tomography (CT) and Magnetic Resonance (MR). The system will work with other image types that are unique to the Navigation Plus application, these data types are FluoroCAT (FCT), Segmentation (SEG) and Cortical Mapping Data (CMD).

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.

3.2 IMPLEMENTATION MODEL

3.2.1 Application Data Flow Diagram

The media interchange application model for the CD-R device and the CDROM device on the Navigation system is shown in the following Illustrations:

- Description of the data Flow Diagram for the CD-R device.

The DICOM ARCHIVE/RESTORE functionality for the CD-R device is handled by the CD-R/CDROM DICOM Media Server Application Entity (AE). The CD-R/CDROM DICOM Media Server Application Entity (AE) is commanded by the user to perform DICOM services operating on the DICOM media through the use of buttons and menu selection on the graphical user interface of the system.

The user requests the creation of a DICOM file set and the writing of this DICOM File Set on a blank CD-R by selecting one or more series from the Patient Database window and selecting the “Send Data To...” button, this will present the user with the option to transfer images to the CD-R device. Images will be burned to the CD device with a DICOMDIR in the base directory, and each image verified for proper transfer. The CD-R is burned as a single session and finalized; no additional data can then be added to the CD-R.

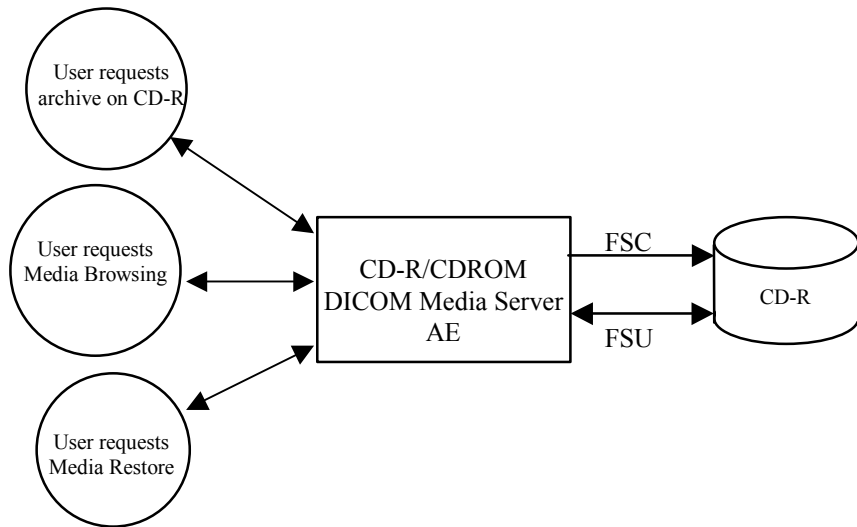
A CD-R inserted into the system will be automatically recursively scanned for DICOM data supported by the Navigation system. The user can view the DICOM contents of a CD-R by selecting the CD Drive device in the patient database window. This will list the DICOM series present on the device. The user can restore a single series or multiple series by highlighting the series and using the “Send Data To...” function, and then select the hard drive as the destination. Copying data to the hard drive is necessary to process and display the image data.

Images of known modalities will be classified as Unusable on the CD and will not show up as a valid series if any of the following conditions exist in the received image data:

- Image Rows(0028,0010) OR Image Columns(0028,0011) tags are missing or are less than or equal to 0.
- Reconstruction Diameter(0018,0090) OR Pixel Spacing(0028,0030) is missing or equals 0.

ILLUSTRATION 3-1

NAVIGATION SYSTEM MEDIA INTERCHANGE APPLICATION MODEL AND DATA FLOW DIAGRAM FOR CD-R DEVICE



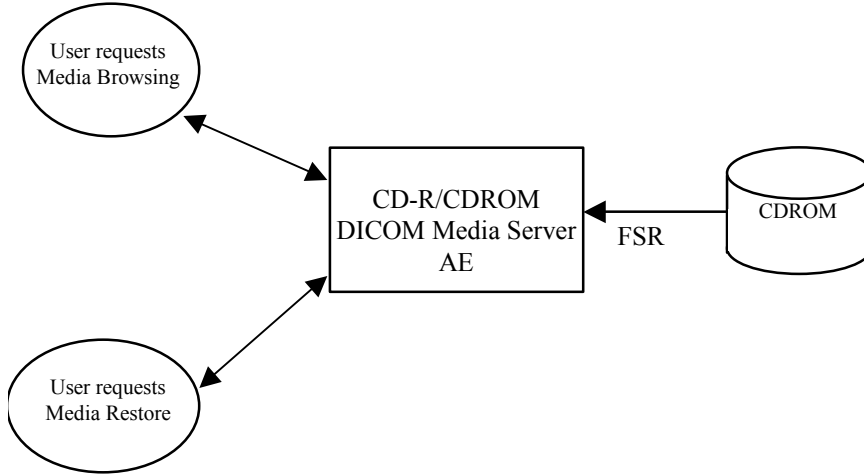
- Description of the data Flow Diagram for the CDROM device.

The DICOM ARCHIVE/RESTORE functionality for the CDROM device is handled by the CD-R/CDROM DICOM Media Server Application Entity (AE). The CD-R/CDROM DICOM Media Server Application Entity (AE) is commanded by the user to perform DICOM services operating on the DICOM media through the use of buttons and menu selection on the graphical user interface of the system.

A CDROM inserted into the system will be automatically scanned for DICOM data supported by the Navigation system. The user can view the DICOM contents of a CDROM by selecting the CD Drive device in the patient database window. This will list the DICOM series present on the device. The user can restore a single series or multiple series by highlighting the series and using the “Send Data To...” function.

ILLUSTRATION 3-2

NAVIGATION SYSTEM MEDIA INTERCHANGE APPLICATION MODEL AND DATA FLOW DIAGRAM FOR CDROM DEVICE



3.2.2 Functional Definition of the DICOM Media Server AE

3.2.2.1 Functional definition of the CD/CDROM DICOM Media Server AE

The CD-R/CDROM DICOM Media Server Application Entity supports the following functions:

- Can write a DICOM File Set (FSC) on a CD-R in a single session.
- Can read a DICOM File Set (FSR) on a CDROM or CD-R.

3.2.3 File Meta Information Options (See PS3.10)

The File Meta-Information for this implementation is :

File Meta-Information Version	1
Navigation Plus System Version 5.2 Implementation UID	1.2.840.113619.6.180

3.3 AE SPECIFICATIONS

3.3.1 DICOM CD-R/CDROM AE Specification

The DICOM CD-R/CDROM SERVER Application Entity provides standard conformance to DICOM Interchange Option of the Media Storage Service Class. The supported Application Profiles and roles are listed below.

Supported Application Profile	Real World Activity	Role	Option
STD-GEN-CD	Browse CD	FSR	Interchange
STD-GEN-CD	Restore CD	FSR	Interchange
STD-GEN-CD	Archive CD	FSC See Note	Interchange

Note: Archive is available only on blank CD-Rs

3.3.1.1 File Meta Information for the DICOM CD-R/CDROM Application Entity

Following are the values set in the File Meta Information for this AE Title :

Source Application Entity Title	SUN1_PC03
Navigation Plus System Version 5.2 Implementation UID	1.2.840.113619.6.180

3.3.1.2 Real-World Activities for the DICOM CD-R/CDROM Application Entity

3.3.1.2.1 Real-World Activity (RWA) “Browse CD”

The CD-R/CDROM DICOM Media Server AE acts as an FSR using the interchange option when requested to browse the CD.

When the CD-R/CDROM DICOM Media Server AE is requested to provide a content listing, the device will be scanned for all DICOM compatible images. These images will be displayed in the patient database window as a series of entries. There will be one entry for each unique Series Instance UID on the device. This grouping will be maintained when selecting and copying data and cannot be changed.

3.3.1.2.1.1 Media Storage Application Profile for the RWA “Browse CD”:

For the list of Application Profiles that invoke this AE for the Browse CD RWA, see the Table in section 3.3.1.

3.3.1.2.1.1.1 Options:

Following are the SOP Classes supported by this AE. All SOP Instances use the Explicit VR Little Endian Uncompressed Transfer Syntax, UID 1.2.840.10008.1.2.1.

SOP Class	SOP Class UID
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
MR Image Storage	1.2.840.10008.5.1.4.1.1.4

3.3.1.2.2 Real-World Activity (RWA) “Restore CD”

The CD-R/CDROM DICOM Media Server AE acts as an FSR using the interchange option when requested to copy SOP instances from the CD to the local database.

The user selects the SOP instances that he wants the DICOM Media Server AE to copy on the local database. Once selected the “Send Data To...” button brings up the option to copy the data to the hard drive. Before copying data to the hard drive the user has the option of selecting the De-Identify Data feature. This option is provided as a tool for HIPAA compliance by removing patient sensitive data from the DICOM data upon transfer. Patient sensitive tags are removed or De-Identified. The user is presented with a dialog to input a user-defined name for each DICOM series selected, a default name is provided. The following table shows which DICOM data tags that are removed or altered when using the De-Identify feature.

Tag Name	ID	De-Identify Value
Instance Creator UID	0008, 0014	Tag is Removed
Institution Name	0008, 0080	“De-Identified” String
Institution Address	0008, 0081	Tag is Removed
Referring Physicians Name	0008, 0090	“De-Identified” String
Station Name	0008, 1010	Tag is Removed
Study Description	0008, 1030	Tag is Removed
Series Description	0008, 103E	Tag is Removed
Institutional Department Name	0008, 1040	Tag is Removed
Physicians of Record	0008, 1048	Tag is Removed
Performing Physicians Name	0008, 1050	Tag is Removed
Name of Physicians Reading Study	0008, 1060	Tag is Removed
Operators Name	0008, 1070	Tag is Removed
Admitting Diagnosis Description	0008, 1080	Tag is Removed
Referenced SOP Instance UID	0008, 1155	Tag is Removed
Derivation Description	0008, 2111	Tag is Removed
Patients Name	0010, 0010	User Defined String
Patient ID	0010, 0020	“De-Identified” String
Patient Birth Date	0010, 0030	“00000000” String
Patients Birth Time	0010, 0032	Tag is Removed
Patient Sex	0010, 0040	Tag is Removed
Other Patient Ids	0010, 1000	Tag is Removed
Other Patient Names	0010, 1001	Tag is Removed

Patient Age	0010, 1010	Tag is Removed
Patients Size	0010, 1020	Tag is Removed
Patients Weight	0010, 1030	Tag is Removed
Ethnic Group	0010, 2160	Tag is Removed
Occupation	0010, 2180	Tag is Removed
Additional Patient History	0010, 21B0	Tag is Removed
Patient Comments	0010, 4000	Tag is Removed
Device Serial Number	0018, 1000	Tag is Removed
Protocol Name	0019, 1030	Tag is Removed
Synchronization Frame of Reference UID	0020, 0200	Tag is Removed
Image Comments	0020, 4000	Tag is Removed
UID	0040, A124	Tag is Removed
Request Attributes Sequence	0040, 0275	Tag is Removed
Accession Number	0040, 050A	“De-Identified” String
Storage Media File Set UID	0088, 0140	Tag is Removed
Referenced Frame of Reference UID	3006, 0024	Tag is Removed
Related Frame of Reference UID	3006, 00C2	Tag is Removed

Only the SOP classes supported by the system are declared to the database in a transfer syntax supported by the system.

3.3.1.2.2.1 Media Storage Application Profile for the RWA “Restore CD”:

For the list of Application Profiles that invoke this AE for the Restore CD RWA, see the Table in section 3.3.1.

3.3.1.2.2.1.1 Options:

Following are the SOP Classes supported by RWA “Restore CD”

SOP Class	SOP Class UID
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
MR Image Storage	1.2.840.10008.5.1.4.1.1.4

3.3.1.2.3 Real-World Activity (RWA) “Archive CD”

The CD-R/CDROM DICOM Media Server AE acts as an FSC using the interchange option when requested to copy SOP instances from the local database to the CD-R.

The user selects the entries in the local patient database that he wants to copy to the CD-R. The user then selects the “Send Data To...” option and selects the CD Drive as the destination device. Before burning the CD the user has the option of selecting the De-Identify Data feature. This option is provided as a tool for HIPAA compliance by removing patient sensitive data from the DICOM data upon transfer. Patient sensitive

tags are removed or De-Identified. The user is presented with a dialog to input a user-defined name for each DICOM series selected, a default name is provided. For a table that shows which DICOM data tags that are removed or altered when using the De-Identify feature see the above section 3.3.1.2.2.

The amount of space required for the selected data is calculated and the user is presented with a dialog to insert a blank CD with enough space to burn the selected data. The dialog displays the size of the selected data in MB.

When the user inserts the CD-R and chooses to continue with the transfer process the CD-R is checked to ensure that it is blank. If the CD-R does not appear to be blank the user will be presented with an appropriate message and the CD automatically ejected.

Upon insertion of blank CD-R media, the CD will be created. After writing of the CD-R is complete, the application will perform verification that will compare each file against the original source file. The user will be presented with an appropriate error message if there is an error encountered at any step in the procedure.

3.3.1.2.3.1 Media Storage Application Profile for the RWA “Archive CD”:

For the list of Application Profiles that invoke this AE for the Archive CD RWA, see the Table in section 3.3.1.

3.3.1.2.3.1.1 Options:

Following are the SOP Classes supported by RWA “Archive CD”

SOP Class	SOP Class UID
Media Storage Directory Storage	1.2.840.10008.1.3.10
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
MR Image Storage	1.2.840.10008.5.1.4.1.1.4

3.4 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

3.4.1 Standard Extended / Specialized / Private SOP Classes

3.4.1.1 Standard Extended SOP Classes

Not applicable

3.4.2 Private Transfer Syntaxes

Not applicable

3.5 CONFIGURATION

The table below lists the configurable DICOM related parameters.

Parameter	Notes
-----------	-------

AE Title	
IP Address	Dotted decimal format.
TCP Port	104 is the default

3.6 SUPPORT OF EXTENDED CHARACTER SETS

No extended character sets are supported.