

SIEMENS

FLUOROSPOT[®] T.O.P. VC10A

**AX**

DICOM Conformance Statement

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1 Introduction

1.1 Overview

The Conformance Statement describes the DICOM interface for the Siemens FLUOROSPOT® T.O.P. VC10A in terms of part 2 of [DICOM].

This introduction describes the application's implemented DICOM functionality in general terms.

1.2 Scope and Field

The Siemens product FLUOROSPOT® T.O.P is a Multipurpose System for digital R/F, Angiography and Interventional Procedures. The FLUOROSPOT® T.O.P. is designed to be integrated into an environment of medical DICOM-based devices. FLUOROSPOT® T.O.P. supports the storage of images utilizing the DICOM "Storage Service Class", the retrieval of worklists from an Information System utilizing the DICOM "Basic Worklist Management Service Class" and the print of images on a printer utilizing the DICOM "Print Management Service".

1.3 Audience

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

1.4 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 as SCU and SCP, respectively.

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 with Siemens and other vendors' Medical equipment. The Conformance Statement should be read and understood in conjunction with the DICOM 3.0 Standard [DICOM]. However, by itself it is not guaranteed to ensure the desired interoperability and a 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 Siemens and non-Siemens equipment.
- Test procedures should be defined and tests should be performed by the user to validate the connectivity desired. DICOM itself and the conformance parts do not specify this.
- The standard will evolve to meet the users' future requirements. Siemens is actively involved in developing the standard further and therefore reserves the right to make changes to its products or to discontinue its delivery.

1.5 Definitions, Terms and Abbreviations

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

Additional Abbreviations and terms are as follows:

| | |
|--------------|---|
| CSE | Customer Service Engineer |
| DSA | Digital Subtraction Angiography |
| RIS | Radiology Information System |
| SIREGRAPH CF | Overtable System by SIEMENS |
| SIT | Siemens Installation Tool, configuration tool used by CSE |
| SUN OS | UNIX operating system from SUN Microsystems, Inc., Palo Alto, USA |

1.6 References

[DICOM] Digital Imaging and Communications in Medicine (DICOM), NEMA PS 3.1-3.14, 1999

2 Image Storage

2.1 Implementation Model

2.1.1 Application Data Flow Diagram

Image Send is performed on the user's request for each study completed or for specific images selected. Upon request, an association will be initiated, one of the images selected will be sent to the remote node and the association will be closed. This procedure will be repeated until all images selected are sent.

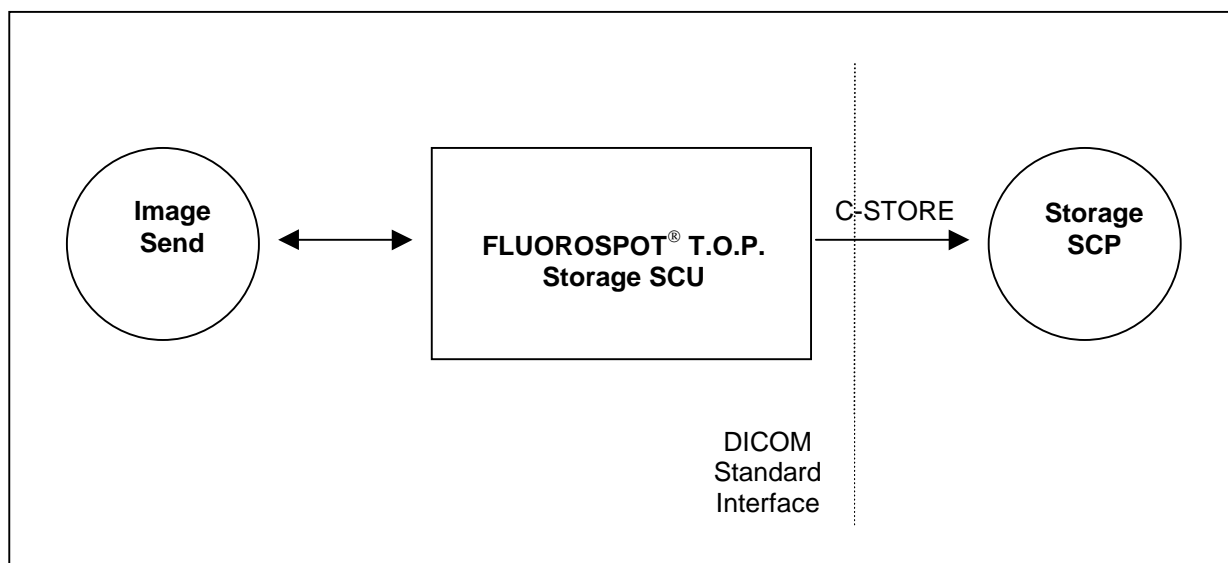


Figure 1: FLUOROSPOT® T.O.P. DICOM Storage Implementation Model

2.1.2 Functional Definition "Image Send"

The FLUOROSPOT® T.O.P. DICOM Application Entity acts as a Service Class User (SCU) for the

- Storage Service Class (to store images in a remote DICOM Node)

Upon the completion of an imaging procedure the FLUOROSPOT® T.O.P. will build a DICOM standard extended data set and initiates sequential associations for each image to be sent. Depending on the configuration the SC IOD, XRF IOD or the XA IOD are used for the data sets.

For more information regarding the DICOM standard extended data sets, please refer to Section 2.2.2.3 "SOP specific Conformance Statement" and Annex A

The Image Send Functionality is initiated through the user interface. The remote destination has to be defined during the configuration procedure.

If any other SCP response status than "Success" or "Warning" is received by FLUOROSPOT® T.O.P., a notification to check for network problems will appear on the user interface.

During the transmission of images to the remote node, a yellow "busy-light" will be displayed. After completion the light turns off automatically.

2.1.3 Sequencing of Real-World Activities

not applicable

2.2 AE Specification

The FLUOROSPOT® T.O.P. Application Entity provides Standard Conformance to the following DICOM SOP Class as a SCU:

| SOP Class Name | SOP Class UID |
|---------------------------------------|------------------------------|
| Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7 |
| X-Ray Angiographic Image Storage | 1.2.840.10008.5.1.4.1.1.12.1 |
| X-Ray RadioFluoroscopic Image Storage | 1.2.840.10008.5.1.4.1.1.12.2 |

2.2.1 Association Establishment Policies

2.2.1.1 General

| | |
|--------------------------------|-----------------------|
| Application Context Name (ACN) | 1.2.840.10008.3.1.1.1 |
| Maximum Length PDU offered | 64 KB |

2.2.1.2 Number of Associations

FLUOROSPOT® T.O.P. will attempt to initiate one association at a time, one for each Image to be sent.

2.2.1.3 Asynchronous Nature

Asynchronous communication, i.e. multiple outstanding transactions over a single association, is not supported.

2.2.1.4 Implementation Identifying Information

| | |
|-----------------------------|-----------------------|
| Implementation Class UID | 1.3.12.2.1107.5.3.3.1 |
| Implementation Version Name | "SIEMENS_FLT_ST" |

2.2.2 Association Initiation by Real-World Activity

FLUOROSPOT® T.O.P. will attempt to initiate a new association for:

- DICOM Image Send (C-STORE)

2.2.2.1 Associated Real-World Activity

Image Send attempts to send an Image Object to a remote node. If the FLUOROSPOT® T.O.P. AE establishes an association to a remote AE, it will transfer one image at a time via the open association. If the C-STORE response from the remote node contains a status other than "Success" or "Warning", the association is aborted. The image remains on the FLUOROSPOT® T.O.P. with the status "Aborted". Image Send can be restarted at any time by user interaction.

The DICOM target nodes will be configured by a CSE with the SIT service tool. For each node it is configurable, whether the SC IOD or the modality specific (XRF or XA) IOD is used.

2.2.2.2 Proposed Presentation Context (Presentation Context Table)

The DICOM Interface of the FLUOROSPOT® T.O.P. will propose the following presentation contexts:

| Presentation Context Table | | | | | |
|---|------------------------------|---|---|------|----------------------|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name List | UID List | | |
| Secondary Captured Image Storage Service Class | 1.2.840.10008.5.1.4.1.1.7 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| X-Ray Angiographic Image Storage Service Class | 1.2.840.10008.5.1.4.1.1.12.1 | DICOM Implicit VR Little Endian JPEG Lossless, Non-Hierarchical (Process 14) | 1.2.840.10008.1.2 1.2.840.10008.1.2.4.70 | SCU | None |
| X-Ray RadioFluoroscopic Image Storage Service Class | 1.2.840.10008.5.1.4.1.1.12.1 | DICOM Implicit VR Little Endian JPEG Lossless, Non-Hierarchical (Process 14) | 1.2.840.10008.1.2 1.2.840.10008.1.2.4.70 | SCU | None |

2.2.2.3 SOP specific Conformance Statement

The DICOM images created by the DICOM interface of the FLUOROSPOT® T.O.P. conform to the DICOM IOD definitions (Standard extended IODs). The objects contain additional elements, so-called "retired" elements from earlier versions of the standard. Please refer to Annex A for a complete listing of all supported DICOM elements.

The receiving DICOM nodes are responsible for data consistency when modifying images. All unknown private data elements have to be removed upon modification.

2.2.3 Association Acceptance Policy

not applicable

2.3 Communication Profiles

2.3.1 Supported Communication Stacks (part 8)

The DICOM Interface of the FLUOROSPOT® T.O.P. provides DICOM TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

2.3.2 TCP/IP Stack

The DICOM Interface of the FLUOROSPOT® T.O.P. uses the TCP/IP stack from the SUN-OS Solaris 2.x system upon which it executes. It uses a subroutine library, based on a Berkeley socket interface.

2.3.3 Physical Media Support

The DICOM Interface of the FLUOROSPOT® T.O.P. is indifferent to the physical medium over which TCP/IP executes. It inherits this from the SUN-OS UNIX System upon which it executes.

2.4 Extensions / Specializations / Privatizations

2.4.1 Standard Extended / Specialized / Private SOPs

For extended IODs see Appendix A

2.4.2 Private Transfer Syntaxes

None

2.5 Configuration

2.5.1 AE Title/Presentation Address Mapping

The Application Entity Title, Host name and Port number are defined via the SIT service tool. The SIT service tool is intended to be used by a CSE only.

2.5.2 Configurable Parameters

The Application Entity Titles, Host names and Port numbers are configured using the SIT.

In the SIT it is configurable for each node, whether the SC IOD or the modality specific (XRF or XA) IOD is used. It is also configurable, if JPEG Compression should be used for Loops (8 Bit, 512 Matrix Size).

The system type (XRF or XA) and the tag Modality (0008,0060) are configurable in the system configuration.

2.5.2.1 Number of Simultaneous Associations

FLUOROSPOT[®] T.O.P. supports for one service only one association at a time.

2.5.2.2 Maximum PDU Size

- max PDU size: 64 KB

2.5.2.3 Time Out

- time-out until a SCP has to accept/reject an association request: 240 sec
- time-out for accepting a message over network: 240 sec

2.6 Support of Extended Character Sets

ISO-IR 100 (ISO 8859-1:1987 Latin Alphabet N 1. supplementary set)

3 Worklist Management

3.1 Implementation Model

3.1.1 Application Data Flow Diagram

Worklist Update is performed as a result of an operator request, or automatically at certain time intervals. Each request results in an initiation for an association. Under normal conditions the association will be closed after receiving a "Success" response from the Information System.

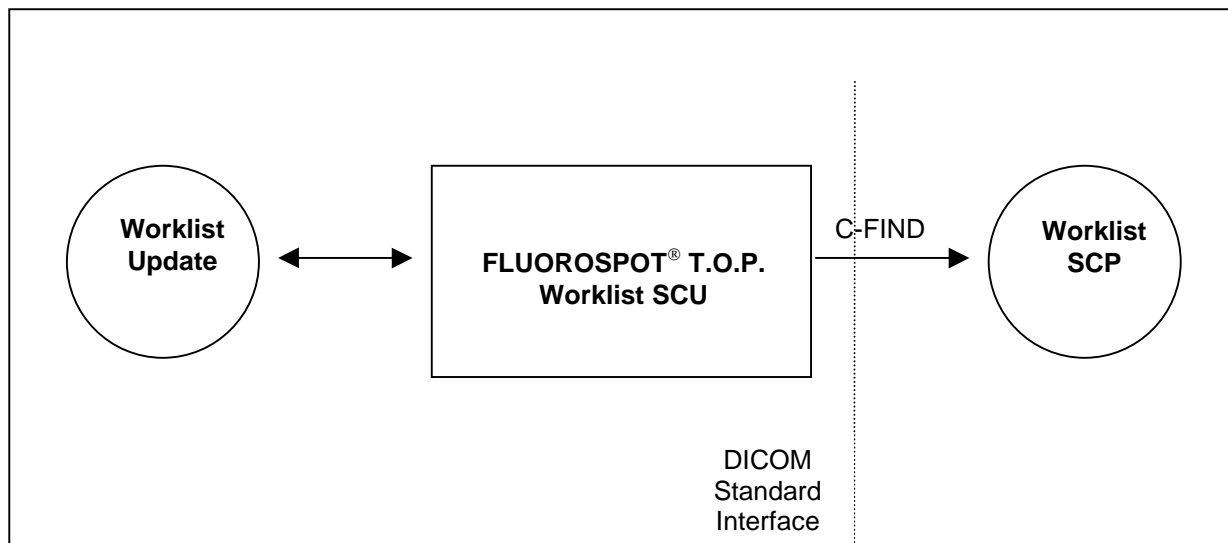


Figure 2: FLUOROSPOT® T.O.P. DICOM Worklist Implementation Model

3.1.2 Functional Definition "Worklist Update"

The FLUOROSPOT® T.O.P. DICOM Application Entity acts as a Service Class User (SCU) for the

- Basic Worklist Management Service Class (to request a Worklist from a RIS)

The request for a Worklist Update is initiated by user interaction, i.e. pressing the button "Update", or automatically at certain time intervals. These intervals are configurable, from one to 60 minutes.

Upon initiation of the request, the FLUOROSPOT® T.O.P. will build an Identifier for the C-FIND request, will initiate an association to send the request and will wait for Worklist responses. After retrieval of all responses, FLUOROSPOT® T.O.P. will access the local data base to add or update patient demographic data.

FLUOROSPOT® T.O.P. requests all items for a specific day (actual date) scheduled for this modality (DF or RF, to be configured) or scheduled for the station (AET). The choice is configurable in the SIT service tool (CSE only).

If any other SCP response status than "Success" or "Pending" is received by FLUOROSPOT® T.O.P., a notification to check for network problems will appear on the user interface.

The FLUOROSPOT® T.O.P. Worklist Request Identifier is described in Annex B "Siemens Worklist Request Identifier Description".

3.1.3 Sequencing of Real-World Activities

not applicable

3.2 AE Specification

The FLUOROSPOT® T.O.P. Application Entity provides Standard Conformance to the following DICOM SOP Class as a SCU:

| SOP Class Name | SOP Class UID |
|--|------------------------|
| Modality Worklist Information Model - FIND | 1.2.840.10008.5.1.4.31 |

3.2.1 Association Establishment Policies

3.2.1.1 General

| | |
|--------------------------------|-----------------------|
| Application Context Name (ACN) | 1.2.840.10008.3.1.1.1 |
| Maximum Length PDU offered | 16 KB |

3.2.1.2 Number of Associations

FLUOROSPOT® T.O.P. will attempt to initiate one association for a Worklist Update request.

3.2.1.3 Asynchronous Nature

Asynchronous communication, i.e. multiple outstanding transactions over a single association, is not supported.

3.2.1.4 Implementation Identifying Information

| | |
|-----------------------------|-----------------------|
| Implementation Class UID | 1.3.12.2.1107.5.3.3.2 |
| Implementation Version Name | "SIEMENS_FLT_WL" |

3.2.2 Association Initiation by Real-World Activity

FLUOROSPOT® T.O.P. will attempt to initiate a new association for:

- DICOM Worklist Update (C-FIND)

3.2.2.1 Associated Real-World Activity

Worklist Update attempts to download a Worklist from a remote node. If the FLUOROSPOT® T.O.P. AE establishes an association to a remote AE, it will transfer all worklist items via the open association.

If the C-FIND responses from the remote node contain a status other than "Success" or "Pending", the association is aborted. The next attempt to establish an association will take place automatically after the configured time interval for Worklist Update (one to 60 minutes), or at the user's request by pressing the Update button.

3.2.2.2 Proposed Presentation Context (Presentation Context Table)

The DICOM Interface of the FLUOROSPOT® T.O.P. will propose the following presentation contexts:

| Presentation Context Table | | | | | |
|--|------------------------|---------------------------------|---------------------|------|----------------------|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name List | UID List | | |
| Modality Worklist Information Model FIND | 1.2.840.10008.5.1.4.31 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| | | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | None |
| | | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |

3.2.2.3 SOP Specific Conformance Statement

Please refer to Annex B for the description of the Siemens Worklist Request Identifier.

3.2.3 Association Acceptance Policy

not applicable

3.3 Communication Profiles

3.3.1 Supported Communication Stacks (part 8)

The DICOM Interface of the FLUOROSPOT® T.O.P. provides DICOM TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

3.3.2 TCP/IP Stack

The DICOM Interface of the FLUOROSPOT® T.O.P. uses the TCP/IP stack from the SUN-OS Solaris 2.x system upon which it executes. It uses a subroutine library, based on a Berkeley socket interface.

3.3.3 Physical Media Support

The DICOM Interface of the FLUOROSPOT® T.O.P. is indifferent to the physical medium over which TCP/IP executes. It inherits this from the SUN-OS UNIX System upon which it executes.

3.4 Extensions/Specializations/Privatizations

3.4.1 Standard Extended Basic Worklist Management

Please refer to Annex B for the description of the Siemens Worklist Request Identifier.

3.4.2 Private Transfer Syntaxes

None

3.5 Configuration

3.5.1 AE Title/Presentation Address Mapping

The Application Entity Title, Host name and Port number are defined via the SIT service tool. The SIT service tool is intended to be used by a CSE only.

3.5.2 Configurable Parameters

The Application Entity Titles, Host names and Port numbers are configured using the SIT.

In the SIT is configurable, if all data for the given modality or only the data for the specific AET is received.

The tag Modality (0008,0060) for the worklist query is configurable in the system configuration. Default is "RF"

3.5.2.1 Number of Simultaneous Associations

FLUOROSPOT® T.O.P. supports for one service only one association at a time.

3.5.2.2 Maximum PDU Size

- max PDU size: 16 KB

3.5.2.3 Time Out

- time-out until a SCP has to accept/reject an association request: 15 sec
- time-out for accepting a message over network: 15 sec

3.6 Support of Extended Character Sets

ISO-IR 100 (ISO 8859-1:1987 Latin Alphabet N 1. supplementary set)

4 Print Management

4.1 Implementation Model

4.1.1 Application Data Flow Diagram

Image Print is performed on the user's request for specific images selected. Upon request, an association will be initiated, a complete film sheet will be sent to the remote node and the association will be closed. This procedure will be repeated until all images selected are sent.

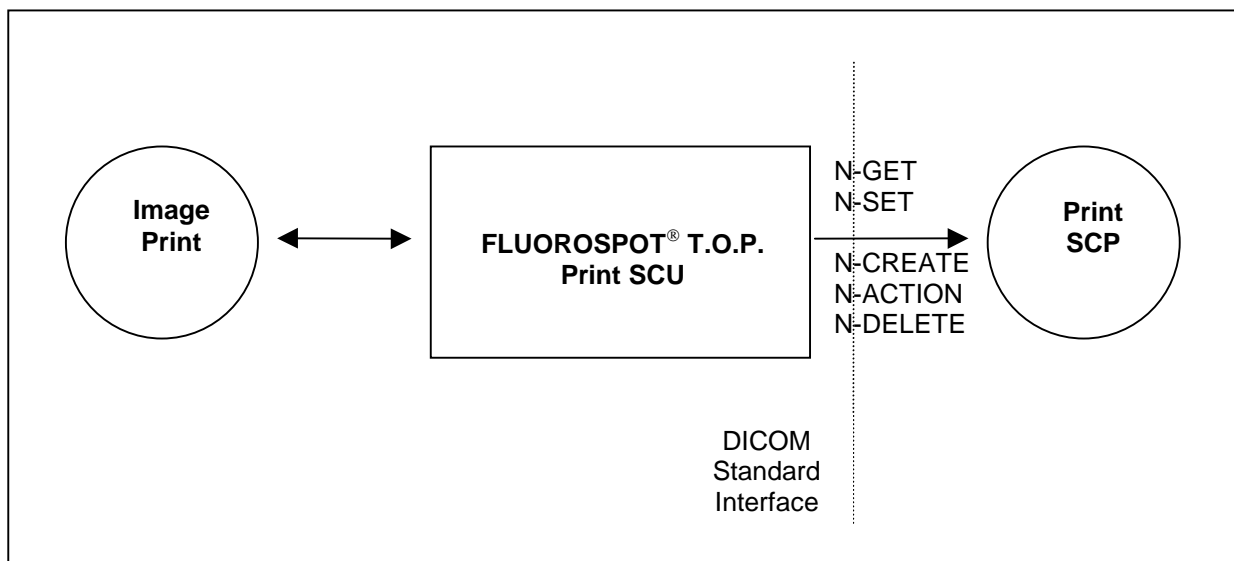


Figure 3: FLUOROSPOT® T.O.P. DICOM Print Management Implementation Model

4.1.2 Functional Definition "Print"

The FLUOROSPOT® T.O.P. DICOM Application Entity acts as a Service Class User (SCU) for the

- Print Management Service Class (to print images in a remote DICOM Node)

Upon the completion of an imaging procedure the FLUOROSPOT® T.O.P. will invoke Basic Grayscale Management Print Management DIMSE services to initiate sequential associations for each film sheet to be sent.

For more information regarding the DICOM standard extended data sets, please refer to Annex C

The print functionality is initiated through the user interface. The remote destination has to be defined during the configuration procedure.

If any other SCP response status than "Success" or "Warning" is received by FLUOROSPOT® T.O.P., a notification will appear on the user interface and an automatic retry will be started.

During the transmission of film sheets to the remote node, a yellow "busy-light" will be displayed. After completion the light turns off automatically.

4.1.3 Sequencing of Real-World Activities

not applicable

4.2 AE Specification

The FLUOROSPOT® T.O.P. Application Entity provides Standard Conformance to the following DICOM SOP Class as a SCU:

| SOP Class Name | SOP Class UID |
|----------------------------------|-----------------------|
| Basic Grayscale Print Management | 1.2.840.10008.5.1.1.9 |

This includes the following SOP Classes

| SOP Class Name | SOP Class UID |
|-------------------------------------|------------------------|
| Basic Film Session SOP Class | 1.2.840.10008.5.1.1.1 |
| Basic Film Box SOP Class | 1.2.840.10008.5.1.1.2 |
| Basic Grayscale Image Box SOP Class | 1.2.840.10008.5.1.1.4 |
| Printer SOP Class | 1.2.840.10008.5.1.1.16 |

4.2.1 Association Establishment Policies

4.2.1.1 General

| | |
|--------------------------------|-----------------------|
| Application Context Name (ACN) | 1.2.840.10008.3.1.1.1 |
| Maximum Length PDU offered | 28 KB |

4.2.1.2 Number of Associations

FLUOROSPOT® T.O.P. will attempt to initiate one association at a time, one for each film sheet to be sent.

4.2.1.3 Asynchronous Nature

Asynchronous communication, i.e. multiple outstanding transactions over a single association, is not supported.

4.2.1.4 Implementation Identifying Information

| | |
|-----------------------------|-----------------------|
| Implementation Class UID | 1.3.12.2.1107.5.3.3.3 |
| Implementation Version Name | "SIEMENS_FLT_VC10" |

4.2.2 Association Initiation by Real-World Activity

FLUOROSPOT® T.O.P. will attempt to initiate a new association for DICOM Print Management. The association is closed after successful print of the film sheet or an error message by the SCP.

4.2.2.1 Associated Real-World Activity

Print Management attempts to print a film sheet with one or more copies on a remote printer. The FLUOROSPOT® T.O.P. prepares a complete film sheet (with header, footer, format division) and uses a 1:1 format to print it on the printer.

If the response from the remote application contains the status "Failure", the session is aborted and after a few seconds a new association is started for retrieval.

Warnings will be ignored by the FLUOROSPOT® T.O.P., errors will be shown in the user interface.

4.2.2.2 Proposed Presentation Context (Presentation Context Table)

The DICOM Interface of the FLUOROSPOT® T.O.P. will propose the following presentation contexts:

| Presentation Context Table | | | | | |
|----------------------------------|-----------------------|---------------------------------|---------------------|------|----------------------|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name List | UID List | | |
| Basic Grayscale Print Management | 1.2.840.10008.5.1.1.9 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| | | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | None |
| | | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |

4.2.2.3 SOP specific Conformance Statement

The Print Management of FLUOROSPOT® T.O.P. conforms to the DICOM Basic Print Management SOP definitions.

The following DIMSE Services are used, to implement the Print Management:

- Printer N_GET
- Basic Film Session N_CREATE
- Basic Film Box N_CREATE
- Basic Grayscale Image Box N_SET
- Basic Film Box N_ACTION
- Printer N_GET
- Basic Film Session N_DELETE

Please refer to Annex C for a complete listing of all supported DICOM elements .

The Print Management is restricted to printers listed in the configuration of the FLUOROSPOT® T.O.P.

4.2.3 Association Acceptance Policy

not applicable

4.3 Communication Profiles

4.3.1 Supported Communication Stacks (part 8)

The DICOM Interface of the FLUOROSPOT® T.O.P. provides DICOM TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

4.3.2 TCP/IP Stack

The DICOM Interface of the FLUOROSPOT® T.O.P. uses the TCP/IP stack from the SUN-OS Solaris 2.x system upon which it executes. It uses a subroutine library, based on a Berkeley socket interface.

4.3.3 Physical Media Support

The DICOM Interface of the FLUOROSPOT® T.O.P. is indifferent to the physical medium over which TCP/IP executes. It inherits this from the SUN-OS UNIX System upon which it executes.

4.4 Extensions / Specializations / Privatizations

4.4.1 Standard Extended / Specialized / Private SOPs

None

4.4.2 Private Transfer Syntaxes

None

4.5 Configuration

4.5.1 AE Title/Presentation Address Mapping

The Application Entity Title, Host name and Port number are defined via the SIT service tool. The SIT service tool is intended to be used by a CSE only.

4.5.2 Configurable Parameters

The Application Entity Titles, Host names and Port numbers are configured using the SIT.

The tag Max Density (2010,0130) is configured using the SIT. Default and recommended is "300"

Depending on the configuration in the SIT, images are sent "linear" or "non-linear" (i.e. with FLUOROSPOT[®] T.O.P. specific LUT). Default and recommended is "non-linear".

The size of the film sheet in pixel (rows, columns) and the selectable film sizes (e.g. "14x17") depend on the configured printer (SIT).

4.5.2.1 Number of Simultaneous Associations

FLUOROSPOT[®] T.O.P. supports for print management only one association at a time.

4.5.2.2 Maximum PDU Size

- max PDU size: 28 KB

4.5.2.3 Time Out

- time-out until a SCP has to accept/reject an association request: 120 sec
- time-out for accepting a message over network: 120 sec
- time-out for waiting for data between packets: 120 sec

4.6 Support of Extended Character Sets

ISO-IR 100 (ISO 8859-1:1987 Latin Alphabet N 1. supplementary set)

5 Verification

5.1 Implementation Model

5.1.1 Application Data Flow Diagram

Verification is performed by a CSE to verify the ability of a foreign DICOM application on a remote node to respond to DICOM messages.

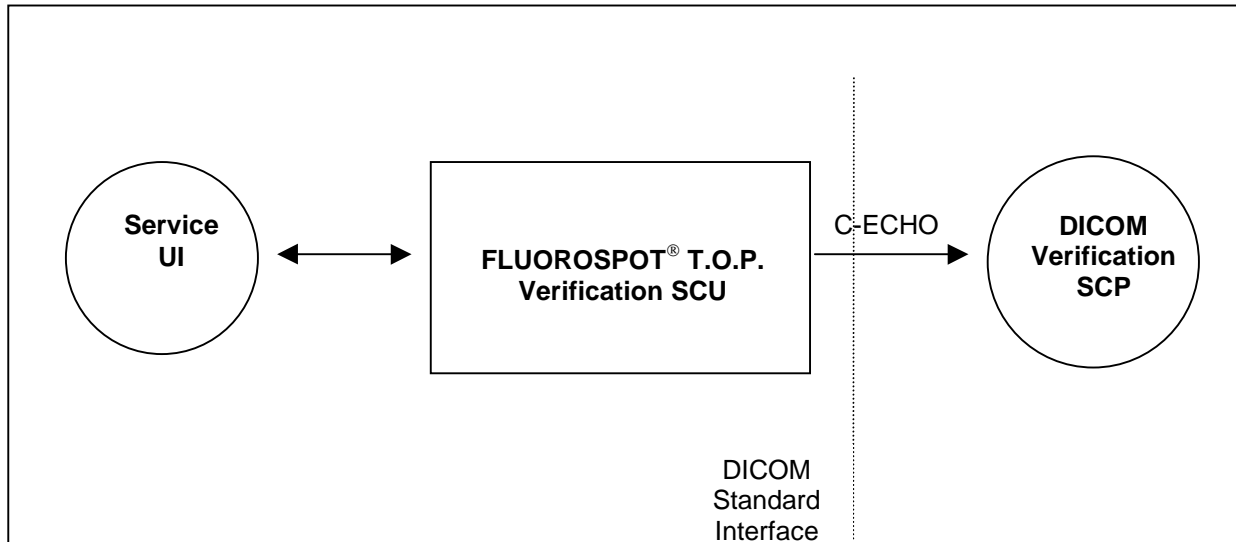


Figure 4: FLUOROSPOT® T.O.P. DICOM Verification Implementation Model

5.1.2 Functional Definition Verification

The Service UI Tool opens an association when a test of a remote application is requested during a configuration session. This can be done after adding or change a remote node in the configuration to verify the communication.

5.1.3 Sequencing of Real-World Activities

not applicable

5.2 AE Specification

The FLUOROSPOT® T.O.P. Application Entity provides Standard Conformance to the following DICOM SOP Class as a SCU:

| SOP Class Name | SOP Class UID |
|----------------|-------------------|
| Verification | 1.2.840.10008.1.1 |

5.2.1 Association Establishment Policies

5.2.1.1 General

| | |
|--|-----------------------|
| Application Context Name (ACN) | 1.2.840.10008.3.1.1.1 |
| Maximum Length PDU offered to a Storage SCP | 64 KB |
| Maximum Length PDU offered to a Worklist SCP | 16 KB |
| Maximum Length PDU offered to a Print SCP | 28 KB |

5.2.1.2 Number of Associations

FLUOROSPOT® T.O.P. will attempt to initiate one association for verification.

5.2.1.3 Asynchronous Nature

Asynchronous communication, i.e. multiple outstanding transactions over a single association, is not supported.

5.2.1.4 Implementation Identifying Information

| | |
|-----------------------------|--|
| Implementation Class UID | 1.3.12.2.1107.5.3.3.1 (Storage) 1.3.12.2.1107.5.3.3.2 (Worklist) 1.3.12.2.1107.5.3.3.3 (Print) |
| Implementation Version Name | "SIEMENS_FLT_ST" (Storage) "SIEMENS_FLT_WL" (Worklist) "SIEMENS_FLT_VC10" (Print) |

5.2.2 Association Initiation by Real-World Activity

FLUOROSPOT® T.O.P. will attempt to initiate a new association for:

- DICOM Verification (C-ECHO)

5.2.2.1 Associated Real-World Activity

The associated Real-World Activity is C-ECHO request initiated by the CSE to check whether a remote node is correctly configured. Any response other than “Success” implies an error in configuration either at the local or at the remote node.

5.2.2.2 Proposed Presentation Context (Presentation Context Table)

The DICOM Interface of the FLUOROSPOT® T.O.P. will propose the following presentation contexts:

| Presentation Context Table | | | | | |
|----------------------------|-------------------|--|---------------------|------|----------------------|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name List | UID List | | |
| Verification | 1.2.840.10008.1.1 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| | | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | None |
| | | DICOM Explicit VR Big Endian (not for Storage) | 1.2.840.10008.1.2.2 | SCU | None |

5.2.2.3 SOP Specific Conformance Statement

Implementation Class UID and Implementation Version Name depend on the Service to be tested.

DICOM Explicit VR Big Endian is not used for testing a Storage SCP

5.2.3 Association Acceptance Policy

not applicable

5.3 Communication Profiles

5.3.1 Supported Communication Stacks (part 8)

The DICOM Interface of the FLUOROSPOT® T.O.P. provides DICOM TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

5.3.2 TCP/IP Stack

The DICOM Interface of the FLUOROSPOT[®] T.O.P. uses the TCP/IP stack from the SUN-OS Solaris 2.x system upon which it executes. It uses a subroutine library, based on a Berkeley socket interface.

5.3.3 Physical Media Support

The DICOM Interface of the FLUOROSPOT[®] T.O.P. is indifferent to the physical medium over which TCP/IP executes. It inherits this from the SUN-OS UNIX System upon which it executes.

5.4 Extensions/Specializations/Privatizations

5.4.1 Standard Extended Basic Worklist Management

None

5.4.2 Private Transfer Syntaxes

None

5.5 Configuration

5.5.1 AE Title/Presentation Address Mapping

The Application Entity Title, Host name and Port number are defined via the SIT service tool. The SIT service tool is intended to be used by a CSE only.

5.5.2 Configurable Parameters

The Application Entity Titles, Host names and Port numbers are configured using the SIT.

5.5.2.1 Number of Simultaneous Associations

FLUOROSPOT[®] T.O.P. supports for one service only one association at a time.

5.5.2.2 Maximum PDU Size

- max PDU size (testing a Storage SCP): 64 KB
- max PDU size (testing a Worklist SCP): 16 KB
- max PDU size (testing a Print SCP): 28 KB

5.5.2.3 Time Out

- time-out until a SCP has to accept/reject an association request: 15 sec
- time-out for accepting a message over network: 15 sec

5.6 Support of Extended Character Sets

ISO-IR 100 (ISO 8859-1:1987 Latin Alphabet N 1. supplementary set)

Annex A: Siemens DICOM Storage Standard Extended IOD Description

Table A.1: Standard Secondary Capture Elements

| Module | Attribute Name | TAG | Type | Comments | Visibility |
|-------------------|---------------------------------|-----------|------|-----------------------------|---|
| Patient | Patient's Name | 0010,0010 | 2 | "Last Name^First Name" | Patient List, New Patient, Image View, Film |
| | Patient ID | 0010,0020 | 2 | RIS or user input | Patient List, New Patient, Image View, Film |
| | Patient's Birth Date | 0010,0030 | 2 | RIS or user input | Patient List, New Patient, Image View, Film |
| | Patient's Sex | 0010,0040 | 2 | RIS or user input | New Patient |
| General Study | Study Instance UID | 0020,000D | 1 | RIS or system generated | |
| | Study Date | 0008,0020 | 2 | | Patient List |
| | Study Time | 0008,0030 | 2 | | Patient List |
| | Referring Physician's Name | 0008,0090 | 2 | RIS | |
| Patient Study | Study ID | 0020,0010 | 2 | System generated | |
| | Accession Number | 0008,0050 | 2 | RIS or User Input | Patient List, New Patient |
| | Admitting Diagnosis Description | 0008,1080 | 3 | RIS | |
| | Modality | 0008,0060 | 1 | Configurable, default: "RF" | |
| General Series | Series Instance UID | 0020,000E | 1 | | |
| | Series Number | 0020,0011 | 2 | | |
| | Laterality | 0020,0060 | 2C | always zero length | |
| | Performing Physician's Name | 0008,1050 | 3 | User input | Patient List, New Patient, Film |
| General Equipment | Manufacturer | 0008,0070 | 2 | "SIEMENS " | |
| | Institution Name | 0008,0080 | 3 | User input | Film |
| | Station Name | 0008,1010 | 3 | Service input (PLA) | |
| | Institutional Department Name | 0008,1040 | 3 | Same as 0008,0080 | |
| | Manufacturer's Model Name | 0008,1090 | 3 | "FLUOROSPOT_TOP01" | Film |
| | Device Serial Number | 0018,1000 | 3 | Host ID | |
| SC Equipment | Software Versions | 0018,1020 | 3 | | |
| | Conversion Type | 0008,0064 | 1 | Defined Term "DI" is used | |
| General Image | Modality | 0008,0060 | 3 | See "General Series" | |
| | Image Number | 0020,0013 | 2 | | |
| Image Pixel | Patient Orientation | 0020,0020 | 2C | always zero length | |
| | Image Date | 0008,0023 | 2C | | Image View, Film |
| | Image Time | 0008,0033 | 2C | | Image View, Film |
| | Image Type | 0008,0008 | 3 | | |
| | Acquisition Number | 0020,0012 | 3 | Same as 0020,0013 | |
| | Acquisition Date | 0008,0022 | 3 | Same as 0008,0023 | |
| | Acquisition Time | 0008,0032 | 3 | Same as 0008,0033 | |
| | Image Comments | 0020,4000 | 3 | User input | Image View, Film |
| | Samples per Pixel | 0028,0002 | 1 | Always "1" | |
| | Photometric Interpretation | 0028,0004 | 1 | "MONOCHROME2" | |
| Overlay Plane | Rows | 0028,0010 | 1 | 1024 or 2048 | Image View, Film |
| | Columns | 0028,0011 | 1 | 1024 or 2048 | Image View, Film |
| | Bits Allocated | 0028,0100 | 1 | 16 | |
| | Bits Stored | 0028,0101 | 1 | 12 | |
| | High Bit | 0028,0102 | 1 | 11 | |
| | Pixel Representation | 0028,0103 | 1 | 0 | |
| | Pixel Data | 7FE0,0010 | 1 | | |
| | Overlay Rows | 6000,0010 | 1 | Same as 0028,0010 | |
| | Overlay Columns | 6000,0011 | 1 | Same as 0028,0011 | |
| | Overlay Type | 6000,0040 | 1 | "G " | |
| VOI LUT | Origin | 6000,0050 | 1 | 1,1 | |
| | Overlay Bits Allocated | 6000,0100 | 1 | 16 | |
| | Bit Position | 6000,0102 | 1 | 12 | |
| | Window Center | 0028,1050 | 3 | -1024 .. 5120 | |
| SOP Common | Window Width | 0028,1051 | 1C | 8 .. 4096 | |
| | SOP Class UID | 0008,0016 | 1 | | |
| SOP Common | SOP Instance UID | 0008,0018 | 1 | | |
| | Specific Character Set | 0008,0005 | 1C | "ISO_IR 100" | |

Table A.2: Elements of the XRF IOD Supported in SC Images

| Module | Attribute Name | Tag | Type | Comments | Visibility |
|----------------------|------------------------------|-----------|------|--|------------------|
| Cine | Cine Rate | 0018,0040 | 3 | (0.5 is rounded to 1) | Image Report |
| X-Ray Image | Pixel Intensity Relationship | 0028,1040 | 1 | "LIN " | |
| | Scan Options | 0018,0022 | 3 | Only with tomo and peri images | |
| X-Ray Acquisition | KVP | 0018,0060 | 2 | | Image Report |
| | Radiation Setting | 0018,1155 | 1 | | |
| | Exposure Time | 0018,1150 | 2C | | |
| | Exposure | 0018,1152 | 2C | Rounded to integer | Image Report |
| | Grid | 0018,1166 | 3 | | |
| | Average Pulse Width | 0018,1154 | 3 | | Image Report |
| | Radiation Mode | 0018,115A | 3 | | |
| | Intensifier Size | 0018,1162 | 3 | | |
| | Field of View Shape | 0018,1147 | 3 | "ROUND " | |
| | Field of View Dimension(s) | 0018,1149 | 3 | | Image Report |
| X-Ray Table | Table Motion | 0018,1134 | 3 | "STATIC" | |
| XRF Positioner | Distance Source to Patient | 0018,1111 | 3 | not with SIREGRAPH CF | |
| | Distance Source to Detector | 0018,1110 | 3 | not with SIREGRAPH CF | |
| XRF Tomo Acquisition | Tomo Layer Height | 0018,1460 | 1 | Only with Tomo Images; not with SIREGRAPH CF | Image View, Film |
| | Tomo Time | 0018,1480 | 3 | Only with Tomo Images; not with SIREGRAPH CF | |

Table A.3: Standard X-Ray Radiofluoroscopic and Standard X-Ray Angiographic Elements

| Module | Attribute Name | TAG | Type | Comments | Visibility |
|-------------------|---------------------------------|-----------|------|--------------------------------------|---|
| Patient | Patient's Name | 0010,0010 | 2 | "Last Name^First Name" | Patient List, New Patient, Image View, Film |
| | Patient ID | 0010,0020 | 2 | RIS or user input | Patient List, New Patient, Image View, Film |
| | Patient's Birth Date | 0010,0030 | 2 | RIS or user input | Patient List, New Patient, Image View, Film |
| | Patient's Sex | 0010,0040 | 2 | RIS or user input | New Patient |
| General Study | Study Instance UID | 0020,000D | 1 | RIS or system generated | |
| | Study Date | 0008,0020 | 2 | | Patient List |
| | Study Time | 0008,0030 | 2 | | Patient List |
| | Referring Physician's Name | 0008,0090 | 2 | RIS | |
| | Study ID | 0020,0010 | 2 | System generated | |
| | Accession Number | 0008,0050 | 2 | RIS or User Input | Patient List, New Patient |
| Patient Study | Admitting Diagnosis Description | 0008,1080 | 3 | RIS | |
| General Series | Modality | 0008,0060 | 1 | Configurable, default: "RF" | |
| | Series Instance UID | 0020,000E | 1 | | |
| | Series Number | 0020,0011 | 2 | | |
| | Laterality | 0020,0060 | 2C | always zero length | |
| | Performing Physician's Name | 0008,1050 | 3 | User input | Patient List, New Patient, Film |
| General Equipment | Manufacturer | 0008,0070 | 2 | "SIEMENS " | |
| | Institution Name | 0008,0080 | 3 | User input | Film |
| | Station Name | 0008,1010 | 3 | Service input (PLA) | |
| | Institutional Department Name | 0008,1040 | 3 | Same as 0008,0080 | |
| | Manufacturer's Model Name | 0008,1090 | 3 | "FLUOROSPOT_TOP01" | Film |
| | Device Serial Number | 0018,1000 | 3 | Host ID | |
| | Software Versions | 0018,1020 | 3 | | |
| General Image | Image Number | 0020,0013 | 2 | | |
| | Patient Orientation | 0020,0020 | 2C | always zero length | |
| | Image Date | 0008,0023 | 2C | | Image View, Film |
| | Image Time | 0008,0033 | 2C | | Image View, Film |
| | Image Type | 0008,0008 | 3 | | |
| | Acquisition Number | 0020,0012 | 3 | Same as 0020,0013 | |
| | Acquisition Date | 0008,0022 | 3 | Same as 0008,0023 | |
| | Acquisition Time | 0008,0032 | 3 | Same as 0008,0033 | |
| | Image Comments | 0020,4000 | 3 | User input | Image View, Film |
| Image Pixel | Samples per Pixel | 0028,0002 | 1 | Always "1" | |
| | Photometric Interpretation | 0028,0004 | 1 | "MONOCHROME2" | |
| | Rows | 0028,0010 | 1 | 512,1024 or 2048 | Image View, Film |
| | Columns | 0028,0011 | 1 | 512,1024 or 2048 | Image View, Film |
| | Bits Allocated | 0028,0100 | 1 | 8 or 16 | |
| | Bits Stored | 0028,0101 | 1 | 8 or 12 | |
| | High Bit | 0028,0102 | 1 | 7 or 11 | |
| | Pixel Representation | 0028,0103 | 1 | 0 | |
| | Pixel Data | 7FE0,0010 | 1 | | |
| Contrast / Bolus | Contrast / Bolus Agent | 0018,0010 | 2 | Always zero length | |
| Cine Mode | Frame Time | 0018,1063 | | | |
| | Cine Rate | 0018,0040 | 3 | (0.5 is rounded to 1) | Image Report |
| Multi-Frame | Number of Frames | 0028,0008 | 1 | Only with multi-frame | |
| | Frame Increment Pointer | 0028,0009 | 1 | 00181063H Only with multi-frame | |
| Mask Module | Mask Subtraction Sequence | 0028,6100 | 1 | Only with DSA multi-frame | |
| | > Mask Operation | 0028,6101 | 1 | "AVG_SUB" | |
| | > Mask Frame Numbers | 0028,6110 | 1C | | |
| | > Mask Sub-pixel Shift | 0028,6114 | 3 | | |
| | Recommended Viewing Mode | 0028,1090 | 2 | Only with DSA multi-frame | |
| Display Shutter | Shutter Shape | 0018,1600 | 1 | "RECTANGULAR\CIRCULAR" or "CIRCULAR" | |
| | Shutter Left Vertical Edge | 0018,1602 | 1C | not if 0028,0100 = 8 | |
| | Shutter Right Vertical Edge | 0018,1604 | 1C | not if 0028,0100 = 8 | |
| | Shutter Upper Horizontal Edge | 0018,1606 | 1C | not if 0028,0100 = 8 | |
| | Shutter Lower Horizontal Edge | 0018,1608 | 1C | not if 0028,0100 = 8 | |

| | | | | | |
|----------------------|------------------------------|-----------|----|--|------------------|
| | Center of Circular Shutter | 0018,1610 | 1C | | |
| | Radius of Circular Shutter | 0018,1612 | 1C | | |
| X-Ray Image | Frame Increment Pointer | 0028,0009 | 1C | See "Multi-Frame Module" | |
| | Image Type | 0008,0008 | 1 | See "General Image Module" | |
| | Pixel Intensity Relationship | 0028,1040 | 1 | "LIN " or "LOG" (DSA multi-frame) | |
| | Samples per Pixel | 0028,0002 | 1 | See "Image Pixel Module" | |
| | Photometric Interpretation | 0028,0004 | 1 | See "Image Pixel Module" | |
| | Bits Allocated | 0028,0100 | 1 | See "Image Pixel Module" | |
| | Bits Stored | 0028,0101 | 1 | See "Image Pixel Module" | |
| | High Bit | 0028,0102 | 1 | See "Image Pixel Module" | |
| | Pixel Representation | 0028,0103 | 1 | See "Image Pixel Module" | |
| | Scan Options | 0018,0022 | 3 | Only with tomo and peri images | |
| X-Ray Acquisition | KVP | 0018,0060 | 2 | | Image Report |
| | Radiation Setting | 0018,1155 | 1 | | |
| | Exposure Time | 0018,1150 | 2C | | |
| | Exposure | 0018,1152 | 2C | | Image Report |
| | Grid | 0018,1166 | 3 | | |
| | Average Pulse Width | 0018,1154 | 3 | | Image Report |
| | Radiation Mode | 0018,115A | 3 | | |
| | Intensifier Size | 0018,1162 | 3 | | |
| | Field of View Shape | 0018,1147 | 3 | "ROUND " | |
| | Field of View Dimension(s) | 0018,1149 | 3 | | Image Report |
| X-Ray Table | Table Motion | 0018,1134 | 3 | "STATIC" | |
| XRF Positioner | Distance Source to Detector | 0018,1110 | 3 | | |
| | Distance Source to Patient | 0018,1111 | 3 | | |
| | Column Angulation | 0018,1450 | 3 | Only with XRF IOD | |
| XRF Tomo Acquisition | Tomo Layer Height | 0018,1460 | 1 | Only with Tomo Images; not with SIREGRAPH CF | Image View, Film |
| | Tomo Time | 0018,1480 | 3 | Only with Tomo Images; not with SIREGRAPH CF | |
| XA Positioner | Distance Source to Patient | 0018,1111 | 3 | Not with SIREGRAPH CF | |
| | Distance Source to Detector | 0018,1110 | 3 | Not with SIREGRAPH CF | |
| | Positioner Motion | 0018,1450 | 2C | "STATIC" Only with XA IOD | |
| | Positioner Primary Angle | 0018,1510 | 2 | Always zero length; Only with XA IOD | |
| | Positioner Secondary Angle | 0018,1511 | 2 | Always zero length; Only with XA IOD | |
| Overlay Plane | Overlay Rows | 6000,0010 | 1 | Same as 0028,0010; not if 0028,0100 = 8 | |
| | Overlay Columns | 6000,0011 | 1 | Same as (0028,0011); not if 0028,0100 = 8 | |
| | Overlay Type | 6000,0040 | 1 | "G " ; not if 0028,0100 = 8 | |
| | Origin | 6000,0050 | 1 | 1,1; not if 0028,0100 = 8 | |
| | Overlay Bits Allocated | 6000,0100 | 1 | 16; not if 0028,0100 = 8 | |
| | Bit Position | 6000,0102 | 1 | 12; not if 0028,0100 = 8 | |
| Multi-Frame Overlay | Number of Frames in Overlay | 6000,0015 | 1 | = number of frames in multi-frame; only with multi-frame | |
| | Image Frame Origin | | 3 | 1; only with multi-frame | |
| Modality LUT | Modality LUT Sequence | 0028,3000 | 3 | Only with DSA multi-frame | |
| | > LUT Description | 0028,3002 | 1C | 4096,0,16 | |
| | > Modality LUT Type | 0028,3004 | 1C | "US" | |
| | > LUT Data | 0028,3006 | 1C | | |
| VOI LUT | Window Center | 0028,1050 | 3 | -1024 .. 5120 | |
| | Window Width | 0028,1051 | 1C | 8 .. 4096 | |
| SOP Common | SOP Class UID | 0008,0016 | 1 | | |
| | SOP Instance UID | 0008,0018 | 1 | | |
| | Specific Character Set | 0008,0005 | 1C | "ISO_IR 100" | |

Comment to special image types:

DSA Images: Logarithmic raw data is sent; Subtraction has to be done by SCP

Multi-Frame Images: Scenes are sent as multi-frame objects (max. object size 150 MB)

8 Bit Loops (0028,0100 = 8): Always 512x512, no rectangular shutter, no overlay graphic

Table A.4: Other Elements Supported (all Images)

| Module | Attribute | Tag | Type | Comments | Visibility |
|---------------------|---------------------------------|-----------|------|-------------------------------|-----------------------------------|
| Patient Medical | Medical Alerts | 0010,2000 | | RIS | |
| | Contrast Allergies | 0010,2110 | | RIS | |
| | Pregnancy Status | 0010,21C0 | | RIS | |
| Image Plane | Pixel Spacing | 0028,0030 | | Used for distance measurement | |
| Requested Procedure | Requested Procedure Description | 0032,1060 | | RIS or user input ("Organ") | Patient List*, New Patient, Film* |
| Visit Status | Current Patient Location | 0038,0300 | | RIS or user input | Patient List, New Patient, Film |
| Requested Procedure | Requested Procedure ID | 0040,1001 | | RIS or user input | Patient List*, New Patient, Film* |

* It is configurable by the user if Accession No., Requested Procedure ID or Organ (Requested Procedure Description), respectively, are shown in the Patient List and on Film.

Table A.5: Retired Elements Supported (all Images)

| Module | Attribute Name | Tag | Type | Comments | Visibility |
|--------|------------------|-----------|------|--------------------------|------------|
| | DATA Set Type | 0008,0040 | RET | 0 | |
| | DATA Set Subtype | 0008,0041 | RET | "IMA DFR " or "IMA TOMO" | |
| | Comments | 0018,4000 | RET | Same as 0020,4000 | |

Table A.6: Private Elements, Displayed on the User Interface

| Attribute | Private Creator | Tag | Comments | Visibility |
|-----------------------------|----------------------------|-----------|-----------------------------------|------------------|
| Edge Enhancement [%] ("E:") | SIEMENS DFR.01 MANIPULATED | 0017,xx29 | [0..100] | Image View, Film |
| Harmonization [%] ("H:") | SIEMENS DFR.01 MANIPULATED | 0017,xx30 | [0..100] | Image View, Film |
| Landmark | SIEMENS DFR.01 MANIPULATED | 0017,xx71 | [0..100] | Image View, Film |
| Pixel Shift horizontal | SIEMENS DFR.01 MANIPULATED | 0017,xx77 | [-20.0 .. +20.0] | Image View, Film |
| Pixel Shift vertical | SIEMENS DFR.01 MANIPULATED | 0017,xx78 | [-20.0 .. +20.0] | Image View, Film |
| Left Marker | SIEMENS DFR.01 MANIPULATED | 0017,xx83 | Text, i.e. "L" | Image View, Film |
| Right Marker | SIEMENS DFR.01 MANIPULATED | 0017,xx84 | Text, i.e. "R" | Image View, Film |
| Image Name Extension 1 | SIEMENS DFR.01 MANIPULATED | 0017,xxA2 | Image Number 1 st line | Image View, Film |
| Image Name Extension 2 | SIEMENS DFR.01 MANIPULATED | 0017,xxA3 | Image Number 2 nd line | Image View, Film |

Annex B: Siemens Worklist Request Identifier Description

| Module Name Attribute Name | Matching Key Type | Return Key Type | Tag | M | R | DICOM Part 3 Tables |
|--|----------------------|-----------------------|--|---|-------------|---------------------------|
| Scheduled Procedure Step Scheduled Procedure Step Sequence > Modality > Scheduled Station AETitle > Scheduled Procedure Step Start Date | R R R R | 1 1 1 1 | 0040,0100 0008,0060 0040,0001 0040,0002 | | F F R | C.4-10 |
| Requested Procedure Requested Procedure ID Requested Procedure Description Study Instance UID | O O O | 1 1C 1 | 0040,1001 0032,1060 0020,000D | | x x x | C.4-11 |
| Imaging Service Request Accession Number Referring Physician's Name | O O | 2 2 | 0008,0050 0008,0090 | | x x | C.4-12 |
| Visit Status Current Patient Location | O | 2 | 0038,0300 | | x | C.3-3 |
| Visit Admission Admitting Diagnosis Description | O | 3 | 0008,1080 | | x | C.3-4 |
| Patient Identification Patient Name Patient ID | R R | 1 1 | 0010,0010 0010,0020 | * | x | C.2-2 |
| Patient Demographic Patient's Birth Date Patient's Sex | O O | 2 2 | 0010,0030 0010,0040 | | x x | C.2-3 |
| Patient Medical Medical Alerts Contrast Allergies Pregnancy Status | O O O | 2 2 2 | 0010,2000 0010,2110 0010,21C0 | | x x x | C.2-4 |

Table B.1: Worklist Request Identifier

Matching Types

M: Matching Key

F: Fixed Single Value (Value configured by CSE)

R: Range matching for start date only (always for actual date, i.e. 19980811-19980811)

*: Wildcard matching for Patient Name

R: Return Keys

x: Universal Matching

The Information Model Module Table defines the fixed structure of the Worklist Request Identifier.

The table should be read as follows:

- First column: Module Name and attributes supported to build a FLUOROSPOT® T.O.P. Worklist Request Identifier.
- Second column: Requested [R] or optional [O] Matching key. FLUOROSPOT® T.O.P. assumes that the Modality Worklist SCP supports Matching Keys as defined in DICOM PS 3.4 K.2.2.1.1, i.e. that a SCP is able to at least perform Fixed Single Value, Wildcard and Date Range matching.
- Third column: Mandatory, conditional and optional Return key.
- Fourth column: Appropriate DICOM tag for this attribute.
- Next two columns: FLUOROSPOT® T.O.P. only expects a "Fixed Value Matching" for "Modality" or Scheduled Station AETitle, respectively, "Range Matching" for "Scheduled

Procedure Step Start Date" and Wildcard Matching for Patient Name. All other attribute are defined as Return Keys only.

- Last column: Reference to the DICOM standard

Annex C: Siemens Basic Grayscale Print Management Description

Table C.1: Basic Film Session

| DIMSE | Attribute Name | Tag | Type | Comments |
|----------|------------------|-----------|------|-------------------|
| N-CREATE | Number of Copies | 2000,0010 | U/M | 1.. 9; User input |

After use the Basic Film Session is closed with N-DELETE

Table C.2: Basic Film Box

| DIMSE | Attribute Name | Tag | Type | Comments |
|----------|---------------------------------|-----------|------|--|
| N-CREATE | Image Display Format | 2010,0010 | M/M | "STANDARD\1,1" |
| | Film Orientation | 2010,0040 | M/M | "PORTRAIT" |
| | Referenced Film Session Service | 2010,0500 | M/M | |
| | >Referenced SOP Class UID | 0008,1150 | M/M | |
| | > Referenced SOP Instance UID | 0008,1155 | M/M | |
| | Film Size ID | 2010,0050 | U/M | "14INx17IN", "11INx14IN" or "8INx10IN"; user input |
| | Magnification Type | 2010,0060 | U/M | "BILINEAR" |
| | Max Density | 2010,0130 | U/M | 200 .. 300; configurable in service |
| | Trim | 2010,0140 | U/U | "NO" |

N-ACTION is used to start printing

Table C.3: Basic Grayscale Image Box

| DIMSE | Attribute Name | Tag | Type | Comments |
|-------|--------------------------------|-----------|------|---------------|
| N-SET | Image Position | 2020,0010 | M/M | 1 |
| | Basic Grayscale Image Sequence | 2020,0110 | M/M | |
| | >Samples Per Pixel | 0028,0002 | M/M | 1 |
| | >Photometric Interpretation | 0028,0004 | M/M | "MONOCHROME2" |
| | >Rows | 0028,0010 | M/M | |
| | >Columns | 0028,0011 | M/M | |
| | >Pixel Aspect Ratio | 0028,0034 | MC/M | 1,1 |
| | >Bits Allocated | 0028,0100 | M/M | 8 |
| | >Bits Stored | 0028,0101 | M/M | 8 |
| | >High Bit | 0028,0102 | M/M | 7 |
| | >Pixel Representation | 0028,0103 | M/M | 0 |
| | >Pixel Data | 7FE0,0010 | M/M | |
| | Polarity | 2020,0020 | U/M | "NORMAL" |

Table C.4: Printer

| DIMSE | Attribute Name | Tag | Type | Comments |
|-------|---------------------|-----------|------|----------|
| N-GET | Printer Status | 2110,0010 | U/M | |
| | Printer Status Info | 2110,0020 | U/M | |

Table C.5: Error Mapping

| Error | SOP Class | Message on User Interface |
|-----------------------------|---|----------------------------------|
| No Network Connection | Association Negotiation | Can not connect to printer |
| C601 | Basic Film Session | Supply Empty |
| C602 | Basic Film Box | Supply Empty |
| C605 | Basic Grayscale Image Box | Supply Empty |
| "SUPPLY EMPTY" | Printer (Printer Status Info) , if Printer Status = "FAILURE" | Supply Empty |
| "RECEIVER FULL" | Printer (Printer Status Info) , if Printer Status = "FAILURE" | Receive Full |
| "NO RECEIVE MGZ" | Printer (Printer Status Info) , if Printer Status = "FAILURE" | Receive Full |
| "FILM JAM" | Printer (Printer Status Info) , if Printer Status = "FAILURE" | Film Jam |
| All other Errors / Failures | | DICOM Error |

Warnings are ignored by the Print Management.