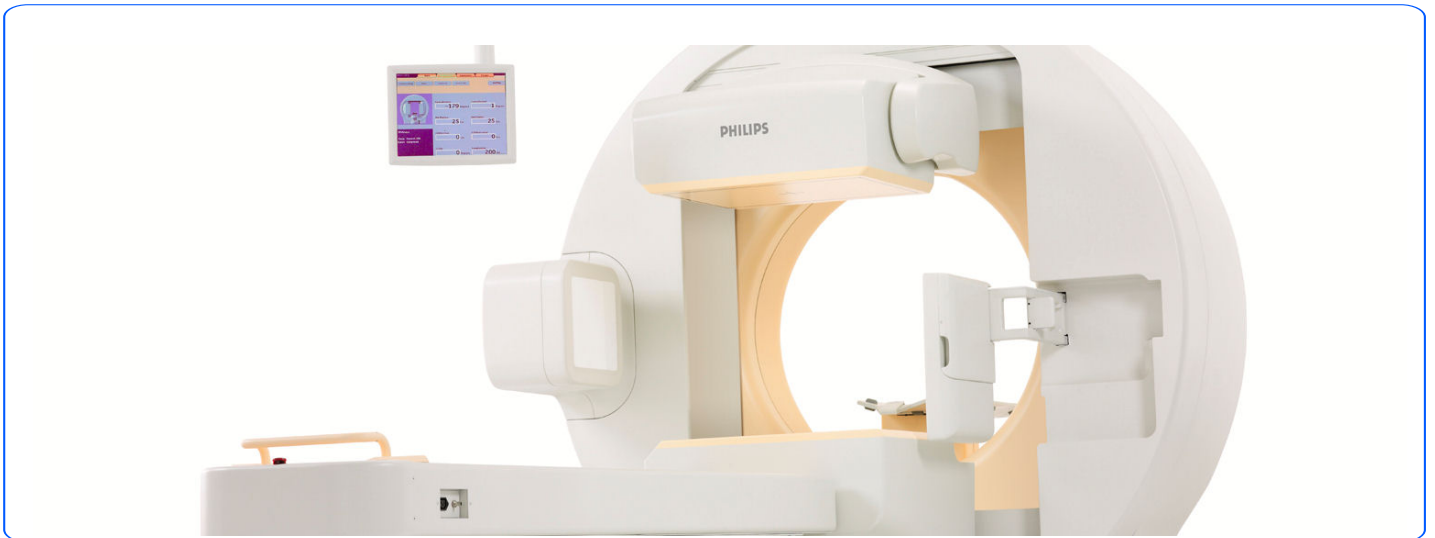

DICOM

Conformance Statement

BrightView X and XCT Acquisition Software 2.0



Issued by:
Philips Healthcare
Nuclear Medicine B/L
3860 North First Street
San Jose
California 95134

email: <mailto:dicom@philips.com>
Internet: <http://www.medical.philips.com/>

Document Number: 459800060611 Rev. A
DMR115280 Rev. 00
Date: 11 May 2010

1. DICOM CONFORMANCE STATEMENT OVERVIEW

The BrightView X is a Gamma camera that can be upgraded in the field to include a Digital X-ray Cone-beam CT camera, making it equivalent to a BrightView XCT camera. The BrightView X and XCT cameras integrate into the healthcare IT infrastructure using DICOM standard interfaces. They are intended to fully support the IHE Scheduled Workflow profile:

1. Modality Worklist query to retrieve schedule procedures,
2. Image Storage to send images to a Nuclear Medicine workstation or a PACS,
3. Storage Commitment to verify that the images were accepted into the workstation or PACS "database" and
4. Modality Performed Procedure Step (MPPS) updates to inform the department scheduling system of the status of the scheduled procedures that have been performed.

This initial release of the BrightView X camera and this update to the BrightView XCT camera does not fully support the IHE Scheduled Workflow profile, as Storage Commitment is not implemented for the CT images and the CT image SOP Instance UIDs are not included in the MPPS Discontinued or Completed messages.

The specific network services provided by the BrightView X and XCT cameras are shown in Table 1.

Table 1: Network Services

SOP Class		User of Service (SCU)	Provider of Service (SCP)
Name	UID		
Verification			
Verification	1.2.840.10008.1.1	Yes	Yes
Transfer			
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Yes	No
CT Image Storage [BrightView XCT and upgraded BrightView X only]	1.2.840.10008.5.1.4.1.1.2	Yes	No
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No
Workflow Management			
Storage Commitment Push Model	1.2.840.10008.1.20.1	Optional	No
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Optional	No
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Optional	No

The services are specified as SCU, SCP, or Optional. Optional means that the service is either configurable or can be purchased separately.

2. TABLE OF CONTENTS

1.	DICOM CONFORMANCE STATEMENT OVERVIEW	3
2.	TABLE OF CONTENTS	4
3.	INTRODUCTION	6
3.1.	REVISION HISTORY	6
3.2.	AUDIENCE	6
3.3.	REMARKS	6
3.4.	DEFINITIONS, TERMS AND ABBREVIATIONS	7
3.5.	REFERENCES	8
4.	NETWORKING	9
4.1.	IMPLEMENTATION MODEL	9
4.1.1.	Application Data Flow	9
4.1.2.	Functional Definition of AE's	11
4.1.2.1.	Functional Definition of Atlantis AE 1	11
4.1.2.2.	Functional Definition of Atlantis AE 2	12
4.1.2.3.	Functional Definition of Atlantis AE 3	12
4.1.2.4.	Functional Definition of Atlantis AE 4	12
4.1.3.	Sequencing of Real World Activities	13
4.2.	AE SPECIFICATIONS	14
4.2.1.	Atlantis AE 1	14
4.2.1.1.	SOP Classes	14
4.2.1.2.	Association Policies	14
4.2.1.2.1.	General	14
4.2.1.2.2.	Number of Associations	14
4.2.1.2.3.	Asynchronous Nature	15
4.2.1.2.4.	Implementation Identifying Information	15
4.2.1.2.5.	Communication Failure Handling	15
4.2.1.3.	Association Initiation Policy	15
4.2.1.3.1.	Verification Activity – Initiation	16
4.2.1.3.2.	Storage Activity – Initiation	17
4.2.1.4.	Association Acceptance Policy	21
4.2.1.4.1.	Verification Activity – Acceptance	22
4.2.1.4.2.	Storage Commitment Activity – Acceptance	23
4.2.2.	Atlantis AE 2	24
4.2.2.1.	SOP Classes	24
4.2.2.2.	Association Policies	25
4.2.2.2.1.	General	25
4.2.2.2.2.	Number of Associations	25
4.2.2.2.3.	Asynchronous Nature	25
4.2.2.2.4.	Implementation Identifying Information	25
4.2.2.2.5.	Communication Failure Handling	26
4.2.2.3.	Association Initiation Policy	26
4.2.2.3.1.	Verification Activity – Initiation	26
4.2.2.3.2.	Storage Activity – Initiation	28
4.2.2.4.	Association Acceptance Policy	29
4.2.3.	Atlantis AE 3	29
4.2.3.1.	SOP Classes	29
4.2.3.2.	Association Policies	29
4.2.3.2.1.	General	29
4.2.3.2.2.	Number of Associations	30
4.2.3.2.3.	Asynchronous Nature	30

4.2.3.2.4.	Implementation Identifying Information.....	30
4.2.3.2.5.	Communication Failure Handling	30
4.2.3.3.	Association Initiation Policy.....	30
4.2.3.3.1.	Verification Activity – Initiation	31
4.2.3.3.2.	Modality Worklist Activity – Initiation.....	32
4.2.3.4.	Association Acceptance Policy	36
4.2.4.	Atlantis AE 4.....	36
4.2.4.1.	SOP Classes	36
4.2.4.2.	Association Policies	37
4.2.4.2.1.	General	37
4.2.4.2.2.	Number of Associations.....	37
4.2.4.2.3.	Asynchronous Nature	37
4.2.4.2.4.	Implementation Identifying Information.....	37
4.2.4.2.5.	Communication Failure Handling	37
4.2.4.3.	Association Initiation Policy.....	37
4.2.4.3.1.	Verification Activity – Initiation	38
4.2.4.3.2.	Modality Performed Procedure Step Activity – Initiation	39
4.2.4.4.	Association Acceptance Policy	43
4.3.	NETWORK INTERFACES.....	43
4.3.1.	Physical Network Interface	43
4.3.2.	Additional Protocols	44
4.4.	CONFIGURATION	44
4.4.1.	AE Title/Presentation Address Mapping	44
4.4.1.1.	Local AE Titles	44
4.4.1.2.	Remote AE Title/Presentation Address Mapping	44
4.4.2.	Parameters.....	45
5.	MEDIA INTERCHANGE.....	46
6.	SUPPORT OF CHARACTER SETS	47
7.	SECURITY	48
7.1.	SECURITY PROFILES	48
7.2.	ASSOCIATION LEVEL SECURITY.....	48
7.3.	APPLICATION LEVEL SECURITY	48
8.	ANNEXES.....	49
8.1.	IOD CONTENTS	49
8.1.1.	Created SOP Instances	49
8.1.1.1.	NM Image IOD	49
8.1.1.2.	SC Image IOD.....	55
8.1.1.3.	CT Image IOD	58
8.1.2.	Usage of Attributes from Received IODs.....	60
8.1.2.1.	Modality Worklist Query IOD.....	60
8.1.3.	Attribute Mapping	60
8.1.4.	Coerced/Modified fields.....	61
8.2.	DATA DICTIONARY OF PRIVATE ATTRIBUTES	61
8.3.	CODED TERMINOLOGY AND TEMPLATES.....	61
8.3.1.	Context Groups	61
8.3.2.	Defined terms	62
8.4.	GRAYSCALE IMAGE CONSISTENCY	62
8.5.	STANDARD EXTENDED/SPECIALIZED/PRIVATE SOPS.....	62
8.6.	PRIVATE TRANSFER SYNTAXES.....	62

3. INTRODUCTION

3.1. Revision History

Table 2: Revision History

Document Version	Date of Issue	Document Status	Description
1.0	28 July 2007	Released	Initial release of this DICOM Conformance Statement for the BrightView cameras
2.0	15 July 2009	Released	Updated with CT-specific information for the BrightView XCT camera
3.0	29 Apr 2010	Released	Updated to support the BrightView X camera

3.2. Audience

This Conformance Statement is intended for:

- (Potential) customers
- System integrators of medical equipment
- Marketing staff interested in system functionality
- Software designers implementing DICOM interfaces

It is assumed that the reader is familiar with the DICOM standard.

3.3. Remarks

The DICOM Conformance Statement is contained in chapter 4 through 8 and follows the contents and structuring requirements of [DICOM] PS 3.2.

This DICOM Conformance Statement by itself does not guarantee successful interoperability of Philips equipment with non-Philips equipment. The user (or user's agent) should be aware of the following issues:

- **Interoperability**
Interoperability refers to the ability of application functions, distributed over two or more systems, to work successfully together. The integration of medical devices into an IT environment may require application functions that are not specified within the scope of DICOM. Consequently, using only the information provided by this Conformance Statement does not guarantee interoperability of Philips equipment with non-Philips equipment.
It is the user's responsibility to analyze thoroughly the application requirements and to specify a solution that integrates Philips equipment with non-Philips equipment.
- **Validation**
Philips equipment has been carefully tested to assure that the actual implementation of the DICOM interface corresponds with this Conformance Statement.
Where Philips equipment is linked to non-Philips equipment, the first step is to compare the relevant Conformance Statements. If the Conformance Statements indicate that successful information exchange should be possible, additional validation tests will be necessary to ensure the functionality, performance, accuracy and stability of image and image related data. It is the responsibility of

the user (or user's agent) to specify the appropriate test suite and to carry out the additional validation tests.

- **New versions of the DICOM Standard**

The DICOM Standard will evolve in future to meet the user's growing requirements and to incorporate new features and technologies. Philips is actively involved in this evolution and plans to adapt its equipment to future versions of the DICOM Standard. In order to do so, Philips reserves the right to make changes to its products or to discontinue its delivery.

The user should ensure that any non-Philips provider linking to Philips equipment also adapts to future versions of the DICOM Standard. If not, the incorporation of DICOM enhancements into Philips equipment may lead to loss of connectivity (in case of networking) and incompatibility (in case of media).

3.4. Definitions, Terms and Abbreviations

DICOM definitions, terms and abbreviations are used throughout this Conformance Statement. For a description of these, see [DICOM] PS 3.3 and PS 3.4.

The word Philips in this document refers to Philips Healthcare.

BrightView XCT refers to the SPECT/CT version of the BrightView camera product line, and BrightView X refers to the SPECT version of the BrightView product line that can be upgraded in the field to a BrightView XCT.

The following acronyms and abbreviations are used in this document.

AE	Application Entity
ANSI	American National Standard Institute
BV	BrightView
CT	Computed Tomography
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
DIMSE-C	DIMSE-Composite
DIMSE-N	DIMSE-Normalized
EBE	DICOM Explicit VR Big Endian
EBW	Extended Brilliance Workstation – a Philips Healthcare product
ELE	DICOM Explicit VR Little Endian
ILE	DICOM Implicit VR Little Endian
IOD	Information Object Definition
MPPS	Modality Performed Procedure Step
NEMA	National Electrical Manufacturers Association
NM	Nuclear Medicine
OSI	Open Systems Interconnection
PACS	Picture Archiving and Communications System
PDU	Protocol Data Unit
RIS	Radiology Information System
RQ	Request
RSP	Response
SC	Secondary Capture
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair
TCP/IP	Transmission Control Protocol/Internet Protocol
UID	Unique Identifier
VR	Value Representation
WLM	Worklist Management

XCT Marketing name for the digital X-ray cone-beam CT in the BrightView camera

3.5. References

[DICOM] Digital Imaging and Communications in Medicine (DICOM), Part 1 – 18 (NEMA PS 3.1 – PS 3.18),
National Electrical Manufacturers Association (NEMA)
Publication Sales 1300 N. 17th Street, Suite 1847
Rosslyn, Virginia. 22209, United States of America

4. NETWORKING

This section describes the networking related DICOM services of the BrightView X and XCT cameras.

4.1. Implementation model

4.1.1. Application Data Flow

The BrightView X and XCT cameras consist of from one to four application entities, depending on configuration: the Atlantis AEs. The following diagrams show the applications entities and their networking interaction using real-world activities.

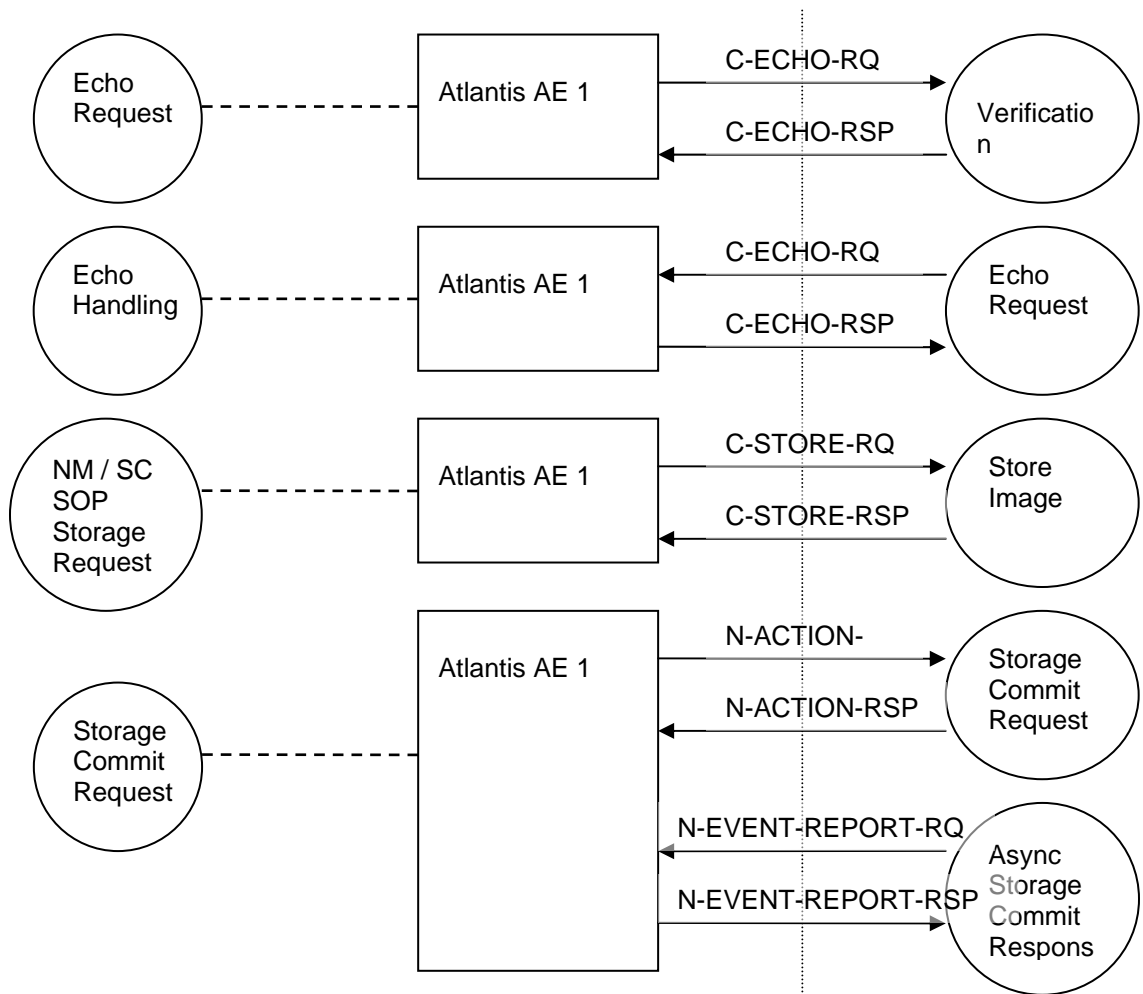


Figure 1: Atlantis AE 1 Application Data Flow Diagram

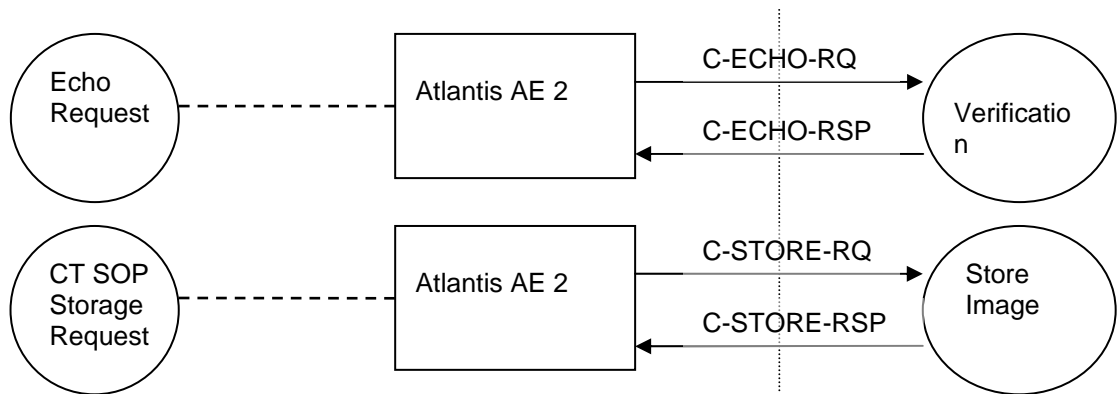


Figure 2: Atlantis AE 2 Application Data Flow Diagram

Atlantis AE 2 is deployed on BrightView XCT and upgraded BrightView X cameras **only**.

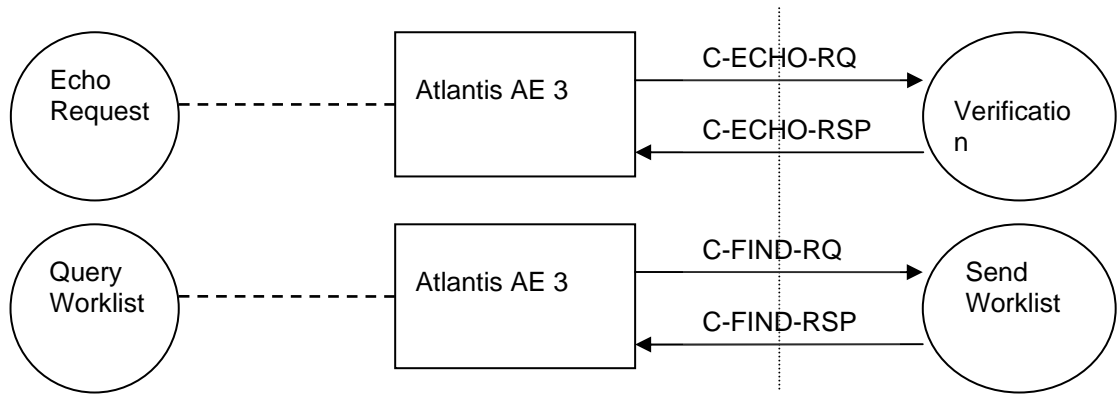


Figure 3: Atlantis AE 3 Application Data Flow Diagram

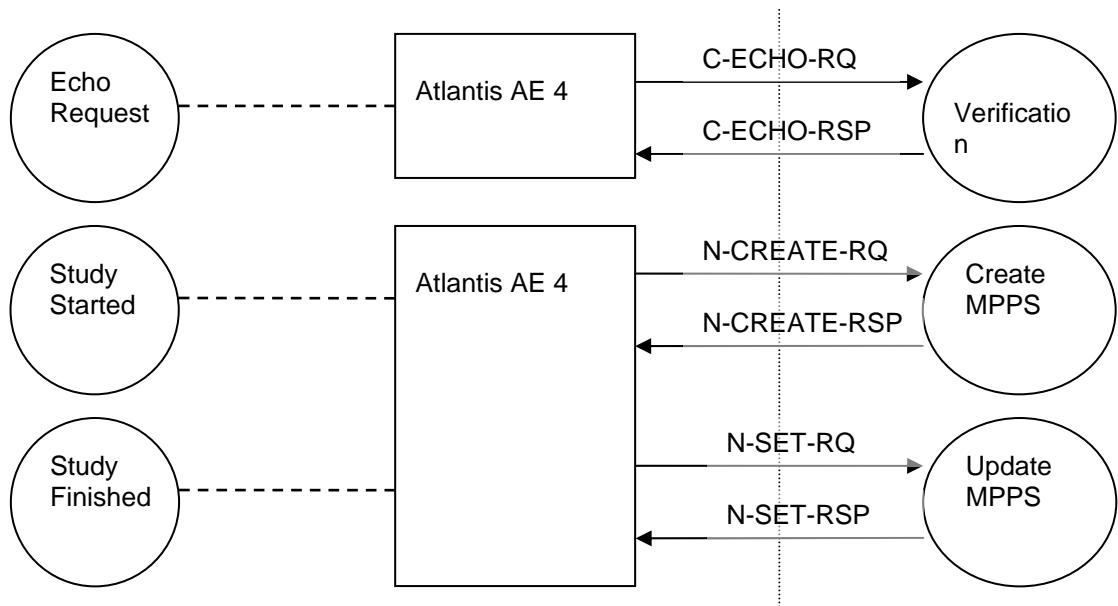


Figure 4: Atlantis AE 4 Application Data Flow Diagram

The Atlantis AEs offer the following functionality:

- Verifying network connection
- Sending worklist query
- Exporting acquired NM images, with or without commit
- Exporting acquired CT images, without commit **[BrightView XCT and upgraded BrightView X only]**
- Exporting secondary captured images, with or without commit
- Sending MPPS status

4.1.2. Functional Definition of AE's

The Atlantis AEs can initiate an association with an SCP to verify application level communication. After receiving the verification response the AE will release the association. A utility program called mc3echo performs C-ECHO to check if a remote DICOM peer is responding.

4.1.2.1. Functional Definition of Atlantis AE 1

The Atlantis AE 1 can accept associations from an external SCU to verify application level communication. After receiving the verification request, the AE will send a verification response. The AE will also release the association upon release by the SCU.

The Atlantis AE 1 can initiate an association with a Storage SCP to export the acquired NM and SC images. After all acquired images have been exported the AE will release the association. Then, for each image, the AE may initiate a new association with the Storage Commitment SCP to request storage commitment. The event report may be sent over the same association as the request, or the SCP may close the association, and request a new association. The AE will accept associations from the Storage Commitment SCP, and acknowledge the receipt of each event report. After receiving the event report(s) the AE will release the association.

4.1.2.2. Functional Definition of Atlantis AE 2

The Atlantis AE 2 can initiate an association with a Storage SCP to export the acquired CT images. After all acquired images have been exported the AE will release the association.

Atlantis AE 2 is deployed on BrightView XCT and upgraded BrightView X cameras **only**.

4.1.2.3. Functional Definition of Atlantis AE 3

The Atlantis AE 3 can initiate an association with a Modality Worklist SCP – such as a RIS – and use the association to query for the applicable worklist. After receiving the worklist the AE will release the association.

4.1.2.4. Functional Definition of Atlantis AE 4

The Atlantis AE 4 can initiate an association with a Modality Performed Procedure Step SCP – such as a RIS or PACS – and use the association to send an N-CREATE or an N-SET message. After receiving the appropriate response, the AE will release the association.

4.1.3. Sequencing of Real World Activities

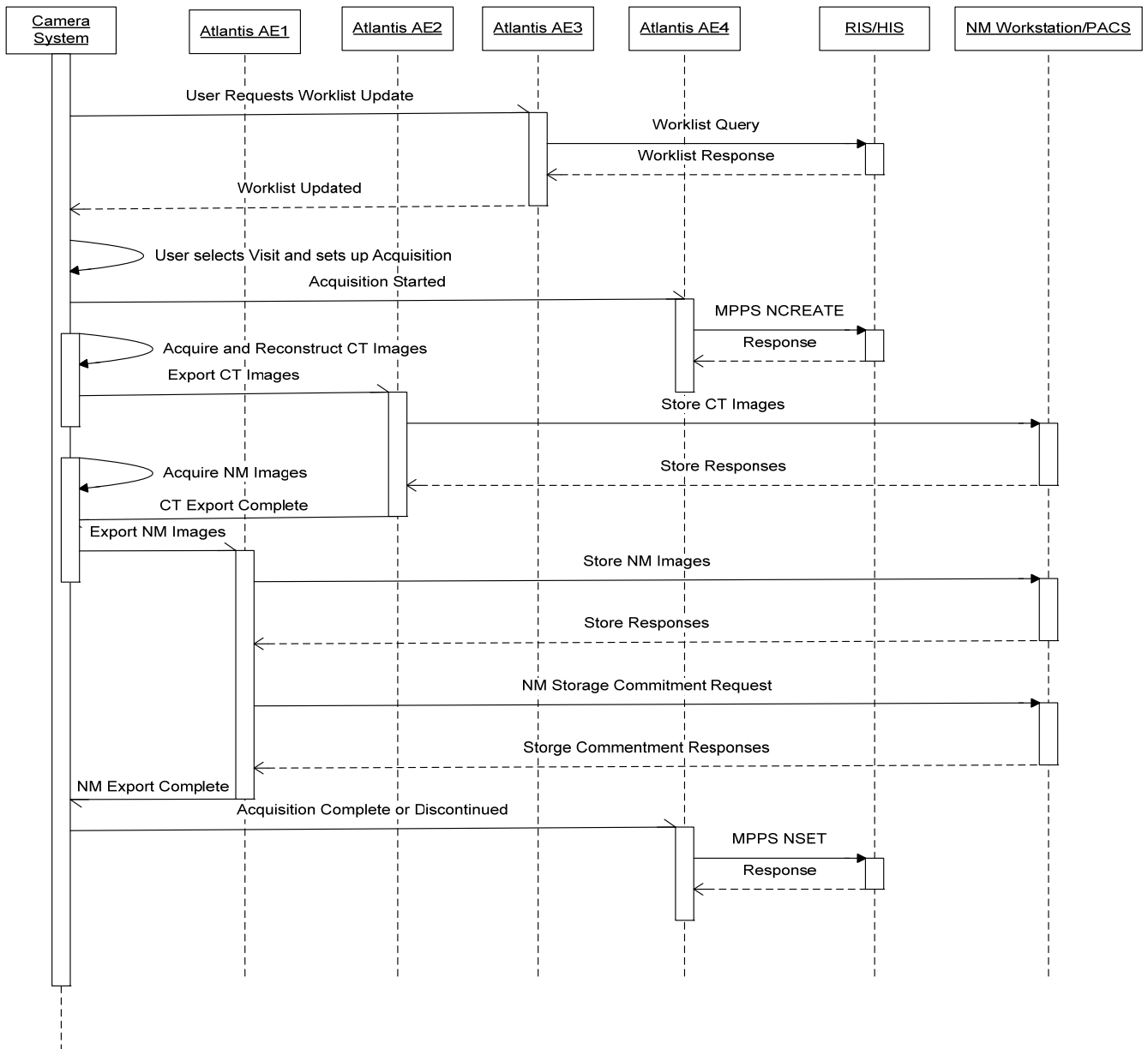


Figure 2: Sequencing of image acquisition

When a RIS interface is configured, the WorkList data can be requested from the RIS and MPPS status can be sent to the RIS.

The acquisition, reconstruction, and export of CT images can be performed on BrightView XCT and upgraded BrightView X cameras **only**.

After acquisition, the images can be sent to a configured DICOM station using the Storage and Storage Commit commands (commit is for NM Images **only**, and can be synchronous or asynchronous).

Verification (C-ECHO) requests can be sent to the RIS or a configured DICOM station in order to verify the connection.

4.2. AE Specifications

4.2.1. Atlantis AE 1

4.2.1.1. SOP Classes

The Atlantis AE 1 provides standard conformance to the following SOP Classes.

Table 3: SOP Classes for Atlantis AE 1

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	Yes	Yes
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Yes	No
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No
Storage Commitment Push Model	1.2.840.10008.1.20.1	Yes	No

4.2.1.2. Association Policies

4.2.1.2.1. General

This implementation generally establishes one association (connection) per SOP interaction, such as Verification, Storage, and Storage Commitment. The association closes at the completion of each interaction. The association aborts if the SOP class is not supported.

Some interactions, such as C-STORE, require a series of packet exchanges. The following are the general rules for transfer:

- The association (connection) remains open until all data is transferred.
- The maximum PDU size is site configurable. The default maximum is 28672 bytes.

Table 4: DICOM Application Context

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

4.2.1.2.2. Number of Associations

The Atlantis AE 1 can independently initiate one (1) Storage or Storage Commitment association per configured Storage target, and one (1) Verification association.

Table 5: Number of Associations as an Association Initiator for Atlantis AE 1

Maximum number of simultaneous associations	2
---	---

The Atlantis AE 1 can simultaneously accept one (1) Storage Commitment association or Verification association.

Table 6: Number of Associations as an Association Acceptor for Atlantis AE 1

Maximum number of simultaneous associations	1
---	---

While it is possible for multiple “applications”, or multiple instances of the same “application”, to be running at the same time with each initiating or accepting an association, this scenario depends on undocumented user actions.

4.2.1.2.3. Asynchronous Nature

The Atlantis AE 1 supports asynchronous Storage Commitment transactions. It does not perform asynchronous operations window negotiation.

4.2.1.2.4. Implementation Identifying Information

The Atlantis AE 1 supplies the following Implementation Class UID and Version Name.

Table 7: DICOM Implementation Class and Version for the Atlantis AE 1

Implementation Class UID	1.3.46.670589.28.1.1
Implementation Version Name	Atlantis710R01

The implementation version contains the release tag of the Atlantis JETStream Acquisition Software on the BrightView X and XCT cameras.

4.2.1.2.5. Communication Failure Handling

When a communication failure occurs the Atlantis AE 1 will attempt to abort the association. Failure details are logged in log files, and in specific circumstances a warning message is displayed to the user. Further details are given in the following sections.

4.2.1.3. Association Initiation Policy

The Atlantis AE 1 will initiate an association as a result of a user action [Verification] or after the completion of an acquisition [Storage and Storage Commitment].

If the association is rejected by the SCP, the AE sends information to the log files and displays a failure message to the user.

If the association is aborted by the SCP, the AE sends information to the log files and displays a failure message to the user.

Table 8 lists the situations in which the Atlantis AE 1 sends an abort request.

Table 8: DICOM Association Initiation Abort Policies

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	In case of command or communication failure.
2 – DICOM UL service-provider	0 – reason-not-specified	Never issued.
	1 – unrecognized-PDU	Never issued.

Source	Reason/Diagnosis	Behavior
	2 – unexpected-PDU	Never issued.
	4 – unrecognized-PDU parameter	Never issued.
	5 – unexpected-PDU parameter	Never issued.
	6 – invalid-PDU-parameter value	Never issued.

When a DICOM communication failure occurs, a warning message is shown in a pop-up window and the failure details are logged in log files.

4.2.1.3.1. Verification Activity – Initiation

4.2.1.3.1.1. Description and Sequencing of Activities

Only a service user can initiate the Verification activity, running the mc3echo program in a command window with parameters specifying the SCU and SCP networking values. The standard sequence of messages is attempted, as shown in Figure 3: Sequencing of Verification. Errors are displayed in the command window, and logged in log files.

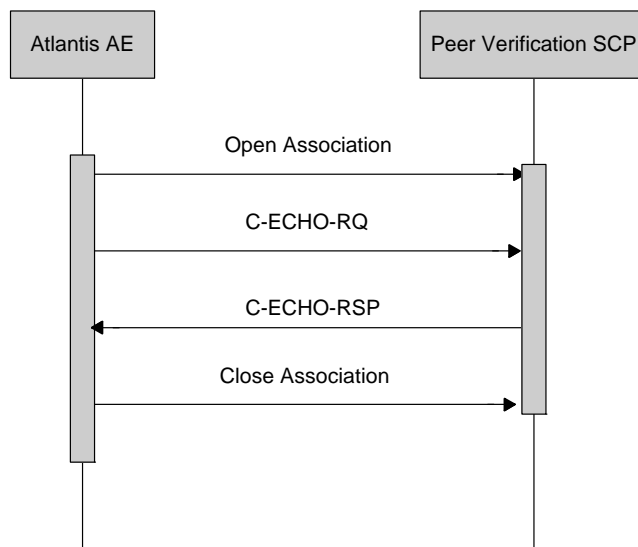


Figure 3: Sequencing of Verification

4.2.1.3.1.2. Proposed Presentation Contexts

Each time an association is initiated, the association initiator proposes a number of presentation contexts to be used on that association. In this subsection, the presentation contexts proposed by Atlantis AE 1 for Verification are defined in Table 9.

Table 9: Proposed 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	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

4.2.1.3.1.3. SOP Specific Conformance for SOP Classes

4.2.1.3.1.3.1. Verification

All details regarding the specific conformance, including response behavior to all status codes, both from an application level and communication errors are provided in Table 10.

Table 10: DICOM C-ECHO Command Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Verification is successful	A success message is displayed.
Communication failures	Any other code	The Atlantis AE could not communicate with the peer DICOM station	The association is aborted and an error message is displayed.

4.2.1.3.2. Storage Activity – Initiation

4.2.1.3.2.1. Description and Sequencing of Activities

At the completion of a successful acquisition, the system automatically stores all acquired images to the single configured storage target. Following successful image storage, and if configured, the system will use Storage Commitment to verify that the NM images were imported into the target system. Storage Commitment of CT images is not currently supported. The specific sequence of associations and messages is shown in Figure 4: Sequencing of Image Storage and Storage Commitment, for the case where the Storage Commitment SCP sends the response on the same association as it receives the request.

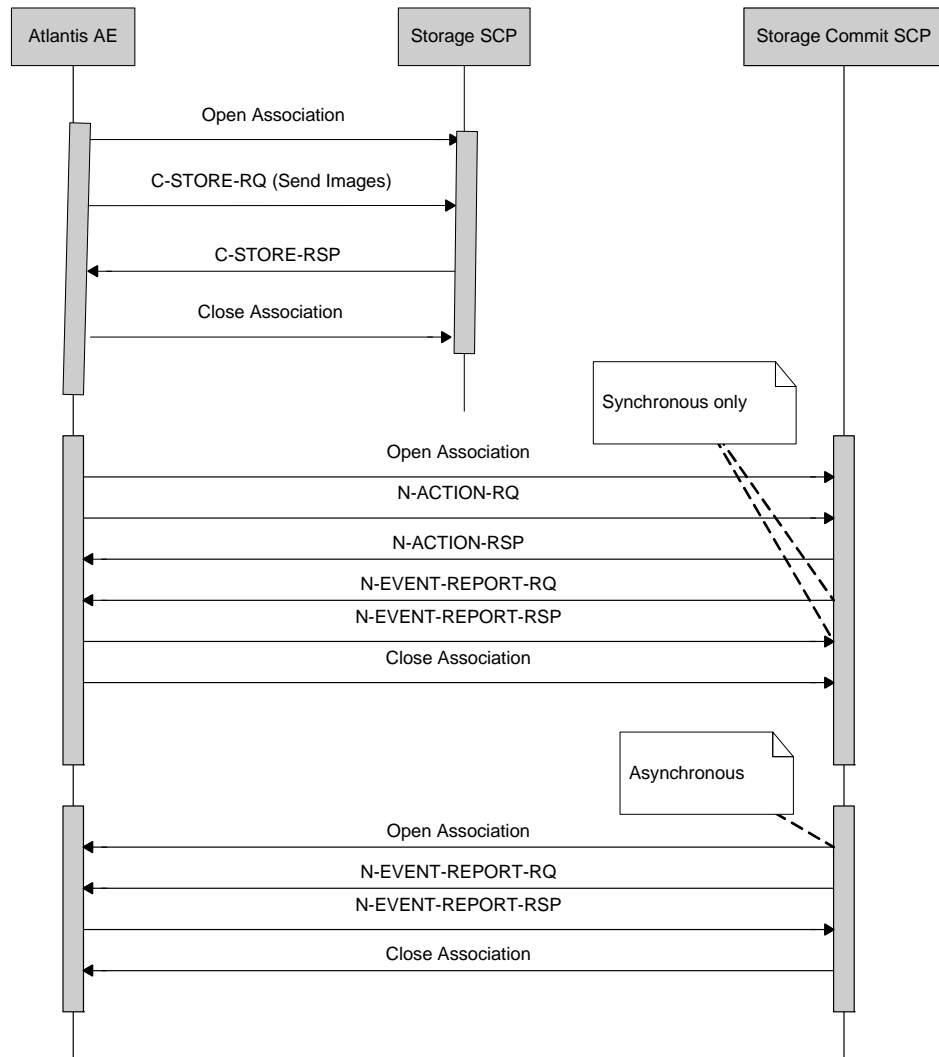


Figure 4: Sequencing of Image Storage and Storage Commitment

4.2.1.3.2.2. Proposed Presentation Contexts

Each time an association is initiated, the association initiator proposes a number of presentation contexts to be used on that association. In this subsection, the presentation contexts proposed by Atlantis AE 1 for Storage and Storage Commitment are defined in Table 11.

Table 11: Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	EBE	1.2.840.10008.1.2.2	SCU	None
		ELE	1.2.840.10008.1.2.1		
		ILE	1.2.840.10008.1.2		
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	EBE	1.2.840.10008.1.2.2	SCU	None
		ELE	1.2.840.10008.1.2.1		
		ILE	1.2.840.10008.1.2		
Storage Commitment Push Model	1.2.840.10008.1.20.1	EBE	1.2.840.10008.1.2.2	SCU	None
		ELE	1.2.840.10008.1.2.1		
		ILE	1.2.840.10008.1.2		

4.2.1.3.2.3. SOP Specific Conformance for SOP Classes

4.2.1.3.2.3.1. Image Storage

The details regarding the specific conformance for the Storage SOP classes supported by the Atlantis AE 1, including application level and communication errors, are the same, and are provided in Table 12.

Table 12: DICOM C-STORE Command Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Storage was successful	A success message is logged.
Failure	A7xx	Refused – Out of resources	A failure message is logged and displayed to the user.
	A9xx	Error – Dataset does not match SOP class	A failure message is logged and displayed to the user.
	Cxxx	Error – Cannot understand	A failure message is logged and displayed to the user.
Warning	B000	Coercion of data elements	Image storage considered successful; a message is logged.
	B006	Elements discarded	Image storage considered successful; a message is logged.
	B007	Dataset does not match SOP class	Image storage considered successful; a message is logged.
Communication failures	Any other code	The Atlantis AE could not communicate with the peer DICOM station	A failure message is displayed to the user, the failure details are logged, and the association is aborted.

The user can request resending images that failed to store.

4.2.1.3.2.3.1. Storage Commitment Operations (N-ACTION)

Storage Commitment requests are only initiated if the camera has been configured to perform storage commitment and if the storage of an NM image was successful.

Storage Commitment for CT images is not currently supported.

The AE does not send the optional Storage Media FileSet ID & UID Attributes or the Referenced Study Component Sequence Attribute in the N-ACTION request.

Table 13 presents the specific conformance for the AE to the various status values in the N-ACTION response.

Table 13: DICOM N-ACTION Command Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Successful notification	A success message is logged.
Failure	0119	Class instance conflict	A generic failure message is logged, the association is aborted, and a message is displayed to the user
	0210	Duplicate invocation	A generic failure message is logged, the association is aborted, and a message is displayed to the user
	0115	Invalid argument value	A generic failure message is logged, the association is aborted, and a message is displayed to the user
	0111	Invalid SOP Instance	A generic failure message is logged, the association is aborted, and a message is displayed to the user
	0212	Mistyped argument	A generic failure message is logged, the association is aborted, and a message is displayed to the user
	0113	No such action	A generic failure message is logged, the association is aborted, and a message is displayed to the user
	0114	No such argument	A generic failure message is logged, the association is aborted, and a message is displayed to the user
	0118	No such SOP class	A generic failure message is logged, the association is aborted, and a message is displayed to the user
	0112	No such SOP Instance	A specific failure message is logged, a message is displayed to the user, and the association is aborted.
	0110	Processing failure	A specific failure message is logged, a message is displayed to the user, and the association is aborted.
	0213	Resource limitation	A generic failure message is logged, the association is aborted, and a message is displayed to the user
0211	Unrecognized operation	A generic failure message is logged, the association is aborted, and a message is displayed to the user	
Communication failures	Any other code	The Atlantis AE could not communicate with the peer DICOM station	A failure message is logged, the association is aborted, and a message is displayed to the user

4.2.1.3.2.3.1. Storage Commitment Notifications (N-EVENT-REPORT)

The Atlantis AE 1 can receive the N-EVENT-REPORT within the outstanding association (Synchronous Commitment) or within a separate association (Asynchronous Commitment).

Table 14: DICOM N-EVENT-REPORT Handling Behavior

Event Type Name	Event Type ID	Behavior
Storage Commitment Request Successful	1	The commitment results for the images referenced by the Referenced SOP Instance UIDs in the Referenced SOP Sequence are set to Commitment Success, are stored in the image database, and a message is sent to the log files.
Storage Commitment Request Complete – Failures Exist	2	The commitment results for the images referenced by the Referenced SOP Instance UIDs in the Referenced SOP Sequence are set to Commitment Success, and a message is sent to the log files. In addition, the commitment results for the images referenced by the Referenced SOP Instance UIDs in the Failed SOP Sequence are set to Commitment Failure, a message is sent to the log files, and a failure message is displayed to the user.

The behavior of the AE in receiving the N-EVENT-REPORT is presented in Table 14, and that for sending the N-EVENT-REPORT response status is in Table 15.

Table 15: DICOM N-EVENT-REPORT Command Response Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Success	The N-EVENT-REPORT was successfully processed.
Failure	0110	Processing failure	The processing was not able to read or match the Transaction UID. No description is provided in the Error Comment attribute.

4.2.1.4. Association Acceptance Policy

The Atlantis AE 1 accepts Verification and Storage Commitment associations if the association request validates and matches the configured networking environment.

The specific association rejection behavior of the AE is summarized in Table 16.

Table 16: DICOM Association Rejection Policies

Result	Source	Reason/Diagnosis	Behavior
1 – rejected-permanent	1 – DICOM UL service-user	1 – no-reason-given	Association failure message is logged. Program is ready for the next association.
		2 – application-context-name-not-supported	Requested application context name not found in configuration file. Association failure message is logged. Program is ready for the next association.
		3 – calling-AE-title-not-recognized	Requested calling AE title not found in configuration file. Association failure message is logged. Program is ready for the next association.
		7 – called-AE-title-not-recognized	Requested called AE title not found in configuration file. Association failure message is logged. Program is ready for the next association.
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	Association failure message is logged. Program is ready for the next association.
		2 – protocol-version-not-supported	Association failure message is logged. Program is ready for the next association.
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	Association failure message is logged. Program is ready for the next association.
		2 – local-limit-exceeded	Association failure message is logged. Program is ready for the next association.
	2 – rejected-transient	1 – DICOM UL service-user	1 – no-reason-given
2 – application-context-name-not-supported			Association failure message is logged. Program is ready for the next association.
3 – calling-AE-title-not-recognized			Association failure message is logged. Program is ready for the next association.
7 – called-AE-title-not-recognized			Association failure message is logged. Program is ready for the next association.
2 – DICOM UL service-provider (ACSE related function)		1 – no-reason-given	Association failure message is logged. Program is ready for the next association.
		2 – protocol-version-not-supported	Association failure message is logged. Program is ready for the next association.
3 – DICOM UL service-provider (presentation related function)		1 – temporary-congestion	Association failure message is logged. Program is ready for the next association.
		2 – local-limit-exceeded	Too many simultaneous associations. Association failure message is logged. Program is ready for the next association.

Table 17 lists the situations in which the Atlantis AE 1 sends an abort request.

Table 17: DICOM Association Acceptance Abort Policies

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	In case of command or communication failure.
2 – DICOM UL service-provider	0 – reason-not-specified	Never issued.
	1 – unrecognized-PDU	Never issued.
	2 – unexpected-PDU	Never issued.
	4 – unrecognized-PDU parameter	Never issued.
	5 – unexpected-PDU parameter	Never issued.
	6 – invalid-PDU-parameter value	Never issued.

When a DICOM communication failure occurs the failure details are logged in log files.

4.2.1.4.1. Verification Activity – Acceptance

4.2.1.4.1.1. Description and Sequencing of Activities

The process that performs Storage and Storage Commitment also supports Verification as an SCP. The standard sequence of messages is shown in Figure 5: Sequencing of Verification. Errors are logged in log files.

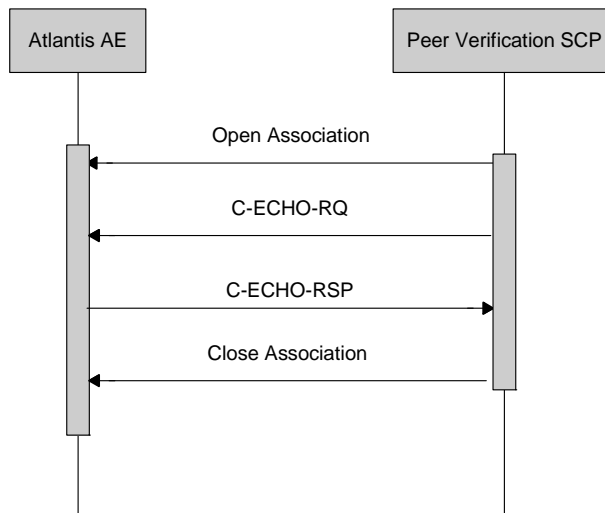


Figure 5: Sequencing of Verification

4.2.1.4.1.2. Proposed Presentation Contexts

In this subsection, the presentation contexts accepted by Atlantis AE 1 for Verification are defined in Table 18.

Table 18: Acceptable 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	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

Any request for other presentation contexts will be ignored.

4.2.1.4.1.3. SOP Specific Conformance for SOP Classes

4.2.1.4.1.3.1. Verification

All details regarding the specific conformance, including response behavior to all status codes, both from an application level and communication errors are provided in Table 19.

Table 19: DICOM C-ECHO Status Response Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Verification is successful	A success message is displayed.
Communication failures		The Atlantis AE could not communicate with the peer DICOM station	An error message is shown.

4.2.1.4.2. Storage Commitment Activity – Acceptance

4.2.1.4.2.1. Description and Sequencing of Activities

Following successful image storage, and if configured, the system will use Storage Commitment to verify that the NM images were imported into the target system. Storage Commitment of CT images is not currently supported. The specific sequence of associations and messages is shown in Figure 6: Sequencing of Storage Commitment, for the case where the Storage Commitment SCP sends the response on a different association than it received the request.

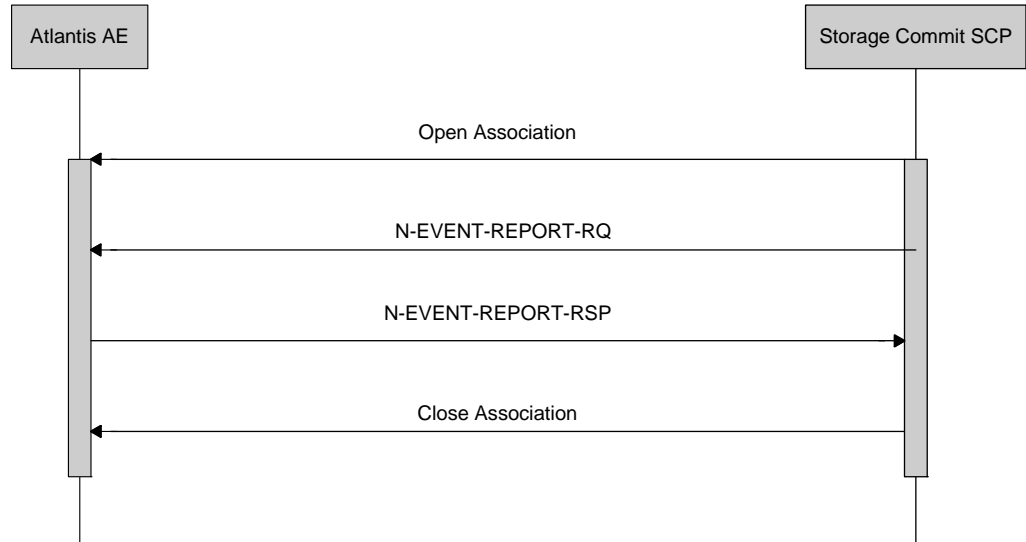


Figure 6: Sequencing of Storage Commitment

4.2.1.4.2.2. Proposed Presentation Contexts

In this subsection, the presentation contexts accepted by Atlantis AE 1 for Storage Commitment are defined in Table 20.

Table 20: Acceptable Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Storage Commitment Push Model	1.2.840.10008.1.20.1	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

Any request for other presentation contexts will be ignored.

4.2.2. Atlantis AE 2

The Atlantis AE 2 is deployed on BrightView XCT and upgraded BrightView X cameras **only**.

4.2.2.1. SOP Classes

The Atlantis AE 2 provides standard conformance to the following SOP Classes.

Table 21: SOP Classes for Atlantis AE 2

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	Yes	No

SOP Class Name	SOP Class UID	SCU	SCP
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	No

4.2.2.2. Association Policies

4.2.2.2.1. General

This implementation generally establishes one association (connection) per SOP interaction, such as Verification and Storage. The association closes at the completion of each interaction. The association aborts if the SOP class is not supported.

Some interactions, such as C-STORE, require a series of packet exchanges. The following are the general rules for transfer:

- The association (connection) remains open until all data is transferred.
- The maximum PDU size is site configurable. The default maximum is 28672 bytes.

Table 22: DICOM Application Context

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

4.2.2.2.2. Number of Associations

The Atlantis AE 2 can independently initiate 1 Verification and Storage association.

Table 23: Number of Associations as an Association Initiator for Atlantis AE 2

Maximum number of simultaneous associations	14
---	----

Typically only one association is active at a time. It is possible for multiple SCU role client applications or multiple instances of the same application to be running at the same time, with each having an association. This case is most likely when the user requests the camera to re-export a Total Body SPECT/CT study that covers the patient from head to toe and includes a high-resolution volume for one CT segment.

The Atlantis AE 2 does not accept any associations.

4.2.2.2.3. Asynchronous Nature

The Atlantis AE 2 does not support asynchronous transactions. It does not perform asynchronous operations window negotiation.

4.2.2.2.4. Implementation Identifying Information

The Atlantis AE 2 supplies the following Implementation Class UID and Version Name.

Table 24: DICOM Implementation Class and Version for the Atlantis AE 2

Implementation Class UID	1.3.46.670589.7.8.6.2
Implementation Version Name	Atlantis710R01

The implementation version contains the release tag of the Atlantis JETStream acquisition software on the BrightView XCT and upgraded BrightView X cameras.

4.2.2.2.5. Communication Failure Handling

When a communication failure occurs, a warning message is shown in a pop-up window and the failure details are logged in log files.

4.2.2.3. Association Initiation Policy

This describes the conditions under which the Atlantis AE 2 will initiate an association.

If the association is rejected by the SCP, the AE sends information to the log files and displays a failure message to the user.

If the association is aborted by the SCP, the AE sends information to the log files and displays a failure message to the user.

In Table 25 the situations are listed in which the Atlantis AE 2 initiates an abort request.

Table 25: DICOM Association Abort Policies

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	If a timer expires before all images have been sent.
2 – DICOM UL service-provider	0 – reason-not-specified	Never issued.
	1 – unrecognized-PDU	Never issued.
	2 – unexpected-PDU	Never issued.
	4 – unrecognized-PDU parameter	Never issued.
	5 – unexpected-PDU parameter	Never issued.
	6 – invalid-PDU-parameter value	Never issued.

When a DICOM communication failure occurs, a warning message is shown in a pop-up window and the failure details are logged in log files.

4.2.2.3.1. Verification Activity – Initiation

4.2.2.3.1.1. Description and Sequencing of Activities

Only a service user can initiate the Verification activity, running the rp_echo program in a command window with parameters specifying the SCU and SCP networking values. The standard sequence of messages is attempted, as shown in Figure 7: Sequencing of Verification. Errors are logged in a log file.

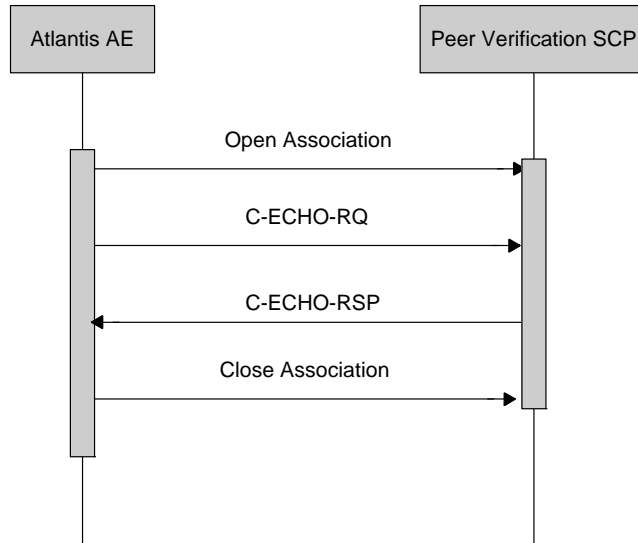


Figure 7: Sequencing of Verification

4.2.2.3.1.2. Proposed Presentation Contexts

Each time an association is initiated, the association initiator proposes a number of presentation contexts to be used on that association. In this subsection, the presentation contexts proposed by Atlantis AE 2 for Verification are defined in Table 26.

Table 26: Proposed 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	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

Any response to any other presentation context will be ignored.

4.2.2.3.1.3. SOP Specific Conformance for SOP Classes

4.2.2.3.1.3.1. Verification

All details regarding the specific conformance, including response behavior to all status codes, both from an application level and communication errors are provided in Table 27.

Table 27: DICOM C-ECHO Command Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Verification is successful	A success message is sent to a log file.
Communication failures		The Atlantis AE could not communicate with the peer DICOM station	An error message is sent to a log file.

4.2.2.3.2. Storage Activity – Initiation

4.2.2.3.2.1. Description and Sequencing of Activities

At the completion of a successful acquisition, the system automatically stores ALL acquired images to the single configured storage target. The specific sequence of associations and messages is shown in Figure 8: Sequencing of Image Storage.

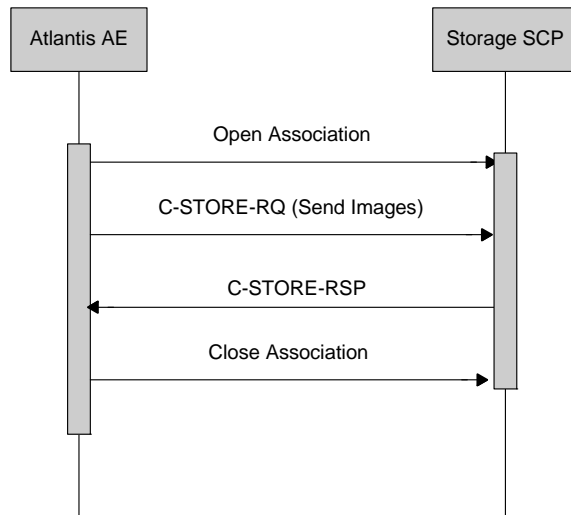


Figure 8: Sequencing of Image Storage

4.2.2.3.2.2. Proposed Presentation Contexts

Each time an association is initiated, the association initiator proposes a number of presentation contexts to be used on that association. In this subsection, the presentation contexts proposed by Atlantis AE 2 for Storage are defined in Table 28.

Table 28: Proposed Presentation Contexts

Presentation Context Table					
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	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

Any response to any other presentation context will be ignored.

4.2.2.3.2.3. SOP Specific Conformance for SOP Classes

4.2.2.3.2.3.1. Storage

All details regarding the specific conformance, including response behavior to all status codes, both from an application level and communication errors are provided in Table 29.

Table 29: DICOM C-STORE Command Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Storage was successful	Continue storing frames, and if the last one is also successful, a message is logged and displayed to the user.
Failure	A7xx	Refused – Out of resources	Close the association, a message is logged and displayed to the user.
	A9xx	Error – Dataset does not match SOP class	Close the association, a message is logged and displayed to the user.
	Cxxx	Error – Cannot understand	Close the association, a message is logged and displayed to the user.
Warning	B000	Coercion of data elements	Close the association, a message is logged and displayed to the user.
	B006	Elements discarded	Close the association, a message is logged and displayed to the user.
	B007	Dataset does not match SOP class	Close the association, a message is logged and displayed to the user.
Communication failures		The Atlantis AE could not communicate with the peer DICOM station	Close the association, an error message is shown in a pop-up window and the failure details are logged in log files.

4.2.2.4. Association Acceptance Policy

The Atlantis AE 2 does not accept any associations.

4.2.3. Atlantis AE 3

4.2.3.1. SOP Classes

The Atlantis AE 3 provides standard conformance to the following SOP Classes.

Table 30: SOP Classes for Atlantis AE 3

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	Yes	No
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Yes	No

4.2.3.2. Association Policies

4.2.3.2.1. General

This implementation generally establishes one association (connection) per SOP interaction, such as Verification and Find. The association closes at the completion of each interaction. The association aborts if the SOP class is not supported.

Some interactions, such as C-FIND-RSP, require a series of packet exchanges. The following are the general rules for transfer:

- The association (connection) remains open until all data is transferred.
- The maximum PDU size is site configurable. The default maximum is 28672 bytes.

Table 31: DICOM Application Context

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

4.2.3.2.2. Number of Associations

The Atlantis AE 3 can independently initiate one Verification and Find association.

Table 32: Number of Associations as an Association Initiator for Atlantis AE 3

Maximum number of simultaneous associations	2
---	---

It is possible for multiple SCU role client applications or multiple instances of the same application to be running at the same time, with each having an association.

The Atlantis AE 3 does not accept any associations.

4.2.3.2.3. Asynchronous Nature

The Atlantis AE 3 does not support asynchronous transactions. It does not perform asynchronous operations window negotiation.

4.2.3.2.4. Implementation Identifying Information

The Atlantis AE 3 supplies the following Implementation Class UID and Version Name.

Table 33: DICOM Implementation Class and Version for the Atlantis AE 3

Implementation Class UID	1.3.46.670589.28.1.1
Implementation Version Name	Atlantis710R01

The implementation version contains the release tag of the Atlantis JETStream acquisition software on the BrightView X and BrightView XCT cameras.

4.2.3.2.5. Communication Failure Handling

When a communication failure occurs, a warning message is shown in a pop-up window and the failure details are logged in log files.

4.2.3.3. Association Initiation Policy

This describes the conditions under which the Atlantis AE 3 will initiate an association.

If the association is rejected by the SCP, the AE sends information to the log files and a failure message may be displayed to the user.

If the association is aborted by the SCP, the AE sends information to the log files and a failure message may be displayed to the user.

In Table 34 the situations are listed in which the Atlantis AE 3 initiates an abort request.

Table 34: DICOM Association Abort Policies

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	In case of any communication or command failure.
2 – DICOM UL service-provider	0 – reason-not-specified	Never issued.
	1 – unrecognized-PDU	Never issued.
	2 – unexpected-PDU	Never issued.

Source	Reason/Diagnosis	Behavior
	4 – unrecognized-PDU parameter	Never issued.
	5 – unexpected-PDU parameter	Never issued.
	6 – invalid-PDU-parameter value	Never issued.

When a DICOM communication failure occurs, a warning message is shown in a pop-up window and the failure details are logged in log files.

4.2.3.3.1. Verification Activity – Initiation

4.2.3.3.1.1. Description and Sequencing of Activities

Only a service user can initiate the Verification activity, running the mc3echo program in a command window with parameters specifying the SCU and SCP networking values. The standard sequence of messages is attempted, as shown in Figure 9: Sequencing of Verification. Errors are displayed in the command window, and logged in log files.

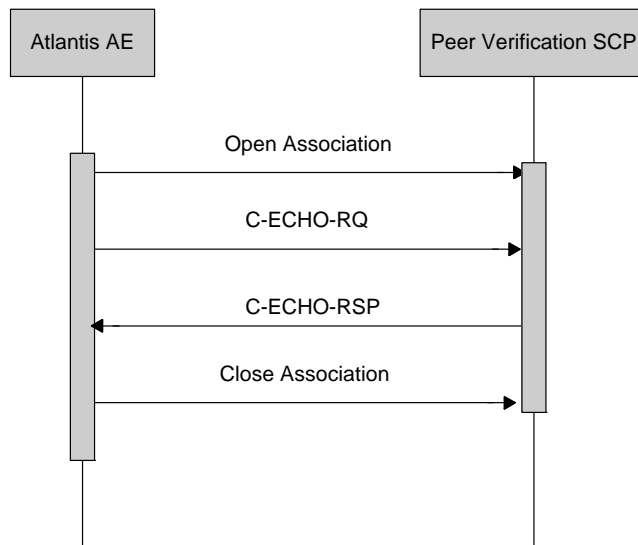


Figure 9: Sequencing of Verification

4.2.3.3.1.2. Proposed Presentation Contexts

Each time an association is initiated, the association initiator proposes a number of presentation contexts to be used on that association. In this subsection, the presentation contexts proposed by Atlantis AE 3 for Verification are defined in Table 35.

Table 35: Proposed 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	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

Any response to any other presentation context will be ignored.

4.2.3.3.1.3. SOP Specific Conformance for SOP Classes

4.2.3.3.1.3.1. Verification

All details regarding the specific conformance, including response behavior to all status codes, both from an application level and communication errors are provided in Table 36.

Table 36: DICOM C-ECHO Command Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Verification is successful	A success message is displayed for the user.
Communication failures		The Atlantis AE could not communicate with the peer DICOM station	An error message is displayed for the user.

4.2.3.3.2. Modality Worklist Activity – Initiation

4.2.3.3.2.1. Description and Sequencing of Activities

Modality Worklist queries can be initiated in one of two ways:

- 1) automatically, at regularly scheduled intervals, and
- 2) manually, from the Acquisition Client user interface.

In either case, the query parameters are composed into a DICOM message, and the standard sequence of messages is attempted, as shown in Figure 10: Sequencing of Modality Worklist. At the end of the interaction, an informational message is displayed to the user informing them that new worklist information has been retrieved.

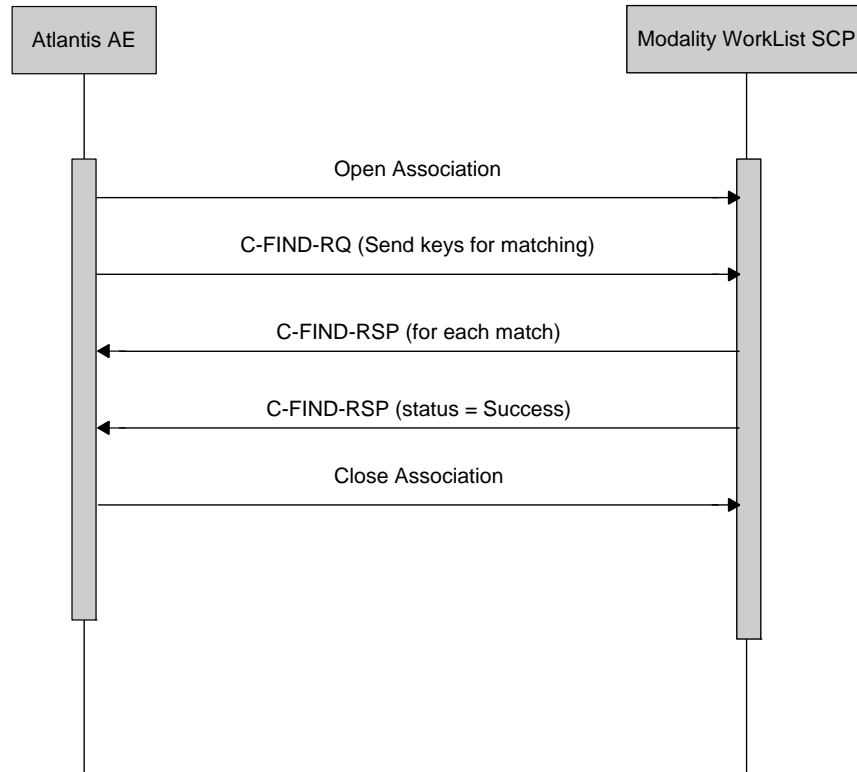


Figure 10: Sequencing of Modality Worklist

4.2.3.3.2.2. Proposed Presentation Contexts

Each time an association is initiated, the association initiator proposes a number of presentation contexts to be used on that association. In this subsection, the presentation contexts proposed by Atlantis AE 3 for Worklist are defined in Table 37.

Table 37: Proposed 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	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

Any response to any other presentation context will be ignored.

4.2.3.3.2.3. SOP Specific Conformance for SOP Classes

4.2.3.3.2.3.1. Modality Worklist

All details regarding the specific conformance, including response behavior to all status codes, both from an application level and communication errors are provided in Table 38.

Table 38: DICOM C-FIND Command Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Matching is complete	Stop waiting for response messages. Add the returned worklist information to the camera database and make it available for retrieval by the user. A success message may also be displayed to the user. Details are logged in log files.
Failure	A700	Refused – Out of resources	Stop waiting for response messages. Error message may be shown in a pop-up window and the failure details are logged in log files.
	A900	Failed – Identifier does not match SOP class	Stop waiting for response messages. Error message may be shown in a pop-up window and the failure details are logged in log files.
	Cxxx	Failed – Unable to process	Stop waiting for response messages. Error message may be shown in a pop-up window and the failure details are logged in log files.
Cancel	FE00	Matching terminated due to Cancel	Stop waiting for response messages, and log details to the log files.
Pending	FF00	Matches are continuing – Current match is supplied and any optional keys are supported in the same manner as required keys	Extract the information from the response message and queue it for adding to the camera database. A message may be logged to the log files.
	FF01	Matches are continuing – Warning that one or more optional keys were not supported for existence for this identifier	Extract the information from the response message and queue it for adding to the camera database. A message may be logged to the log files.
Communication failures		The Atlantis AE could not communicate with the peer DICOM station	Stop waiting for response messages, and abort the association. Error message may be shown in a pop-up window and the failure details are logged in log files.

The display of messages to the user (in pop-up panels or in text panels) depends on several conditions: whether the worklist query was initiated automatically by the system or directly by the user; and whether the user is viewing the patient schedule list at the time the message would be displayed or whether they are viewing some other part of the user interface. Pop-up messages are most likely when the worklist query was manually requested and the user is currently viewing the patient list. Pop-up messages are not expected if the query is successful and the user is not viewing the patient list.

Table 39 lists in detail the applied attributes in the C-FIND Service Elements of this supported SOP class.

Table 39 should be read as follows:

Attribute name	:	Attributes supported to build a Modality Worklist Request Identifier.
Tag	:	DICOM tag for this attribute.
VR	:	DICOM VR for this attribute.
M	:	Matching Keys for Worklist Query.

An “S” will indicate an attribute value for Single Value Matching,

an “R” will indicate an attribute value for Range Matching,

an “W” will denote Wildcard Matching (* and ?) and

an “U” will indicate an attribute for Universal Matching

- R : Return Keys. An “x” indicates that this attribute can be used as a Return Key with zero length for Universal Matching.
- Q : Interactive Query Key. An “x” indicates that this attribute can be used as a matching key with a user entered value.
- D : Displayed Keys. An “x” indicates that this Worklist attribute is displayed to the user during a patient registration dialog.
- IOD : An “x” indicates that this Worklist attribute is included in all object Instances.

Table 39: DICOM Worklist C-FIND Request Identifier

Attribute Name	Tag	VR	M	R	Q	D	IOD
Scheduled Procedure Step Sequence	0040,0100	SQ		X			X
>Scheduled Station AE Title	0040,0001	AE	S, U		X		
>Scheduled Procedure Step Start Date	0040,0002	DA	S, R, W, U		X	X	X
>Scheduled Procedure Step Start Time	0040,0003	TM		X			X
>Modality	0008,0060	CS	S, U		X		
>Scheduled Performing Physician’s Name	0040,0006	PN	W, U		X		
>Scheduled Procedure Step Description	0040,0007	LO		X			X
>Scheduled Station Name	0040,0010	SH		X			
>Scheduled Protocol Code Sequence	0040,0008	SQ		X			X
>>Code Value	0008,0100	SH		X			X
>>Coding Scheme Designator	0008,0102	SH		X			X
>>Code Meaning	0008,0104	LO		X			X
>Scheduled Procedure Step ID	0040,0009	SH		X			X
Requested Procedure ID	0040,1001	SH		X			X
Requested Procedure Description	0032,1060	LO		X			X
Requested Procedure Code Sequence	0032,1064	SQ		X			X
>Code Value	0008,0100	SH		X			X
>Coding Scheme Designator	0008,0102	SH		X			X
>Code Meaning	0008,0104	LO		X			X
Study Instance UID	0020,000D	UI		X			X
Requested Procedure Comments	0040,1400	LT		X			X
Names of Intended Recipients of Results	0040,1010	PN		X			X
Reason for the Requested Procedure	0040,1002	LO		X			X

Attribute Name	Tag	VR	M	R	Q	D	IOD
Accession Number	0008,0050	SH	S, U		X	X	X
Requesting Physician	0032,1032	PN		X	X	X	X
Referring Physician's Name	0008,0090	PN	W, U		X	X	X
Imaging Service Request Comments	0040,2400	LT		X			X
Patient's Name	0010,0010	PN	W, U		X	X	X
Patient ID	0010,0020	LO	S, U		X	X	X
Other Patient Ids	0010,1000	LO		X			X
Patient's Birth Date	0010,0030	DA		X			X
Patient's Sex	0010,0040	CS		X			X
Patient's Size	0010,1020	DS		X			X
Patient's Weight	0010,1030	DS		X			X
Patient State	0038,0500	LO		X			X
Pregnancy Status	0010,21C0	US		X			X
Medical Alerts	0010,2000	LO		X			X
Contrast Allergies	0010,2110	LO		X			X
Special Needs	0038,0050	LO		X			X

When the user selects a worklist entry and presses the PROCEED button the following restrictions apply:

- Leading and trailing spaces are stripped from most string values.

4.2.3.4. Association Acceptance Policy

The Atlantis AE 3 does not accept any associations.

4.2.4. Atlantis AE 4

4.2.4.1. SOP Classes

The Atlantis AE 4 provides standard conformance to the following SOP Classes.

Table 40: SOP Classes for Atlantis AE 4

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	Yes	No
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Yes	No

4.2.4.2. Association Policies

4.2.4.2.1. General

This implementation generally establishes one association (connection) per SOP interaction, such as Verification and MPPS. The association closes at the completion of each interaction. The association aborts if the SOP class is not supported.

Some interactions, such as N-EVENT-REPORT, require a series of packet exchanges. The following are the general rules for transfer:

- The association (connection) remains open until all data is transferred.
- The maximum PDU size is site configurable. The default maximum is 28672 bytes.

Table 41: DICOM Application Context

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

4.2.4.2.2. Number of Associations

The Atlantis AE 4 can independently initiate one Verification and MPPS association.

Table 42: Number of Associations as an Association Initiator for Atlantis AE 4

Maximum number of simultaneous associations	2
---	---

It is possible for multiple SCU role client applications or multiple instances of the same application to be running at the same time, with each having an association.

The Atlantis AE 4 does not accept any associations.

4.2.4.2.3. Asynchronous Nature

The Atlantis AE 4 does not support asynchronous transactions. It does not perform asynchronous operations window negotiation.

4.2.4.2.4. Implementation Identifying Information

The Atlantis AE 4 supplies the following Implementation Class UID and Version Name.

Table 43: DICOM Implementation Class and Version for the Atlantis AE 4

Implementation Class UID	1.3.46.670589.28.1.1
Implementation Version Name	Atlantis710R01

The implementation version contains the release tag of the Atlantis JETStream acquisition software on the BrightView X and BrightView XCT cameras.

4.2.4.2.5. Communication Failure Handling

When a communication failure occurs, a warning message is shown in a pop-up window and the failure details are logged in log files.

4.2.4.3. Association Initiation Policy

This describes the conditions under which the Atlantis AE 4 will initiate an association.

If the association is rejected by the SCP, the AE sends information to the log files and displays a failure message to the user.
 If the association is aborted by the SCP, the AE sends information to the log files and displays a failure message to the user.

In Table 44 the situations are listed in which the Atlantis AE 4 initiates an abort request.

Table 44: DICOM Association Abort Policies

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	In case of any communication or command failure.
2 – DICOM UL service-provider	0 – reason-not-specified	Never issued.
	1 – unrecognized-PDU	Never issued.
	2 – unexpected-PDU	Never issued.
	4 – unrecognized-PDU parameter	Never issued.
	5 – unexpected-PDU parameter	Never issued.
	6 – invalid-PDU-parameter value	Never issued.

When a DICOM communication failure occurs, a warning message is shown in a pop-up window and the failure details are logged in log files.

4.2.4.3.1. Verification Activity – Initiation

4.2.4.3.1.1. Description and Sequencing of Activities

Only a service user can initiate the Verification activity, running the mc3echo program in a command window with parameters specifying the SCU and SCP networking values. The standard sequence of messages is attempted, as shown in Figure 11: Sequencing of Verification. Errors are displayed in the command window, and logged in log files.

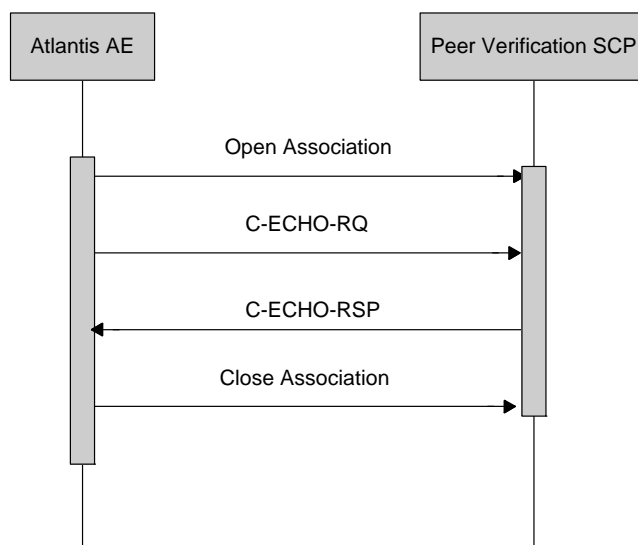


Figure 11: Sequencing of Verification

4.2.4.3.1.2. Proposed Presentation Contexts

Each time an association is initiated, the association initiator proposes a number of presentation contexts to be used on that association. In this subsection, the presentation contexts proposed by Atlantis AE 4 for Verification are defined in Table 45.

Table 45: Proposed 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	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

Any response to any other presentation context will be ignored.

4.2.4.3.1.3. SOP Specific Conformance for SOP Classes

4.2.4.3.1.3.1. Verification

All details regarding the specific conformance, including response behavior to all status codes, both from an application level and communication errors are provided in Table 46.

Table 46: DICOM C-ECHO Command Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Verification is successful	A success message is displayed.
Communication failures		The Atlantis AE could not communicate with the peer DICOM station	An error message is shown.

4.2.4.3.2. Modality Performed Procedure Step Activity – Initiation

4.2.4.3.2.1. Description and Sequencing of Activities

A Modality Performed Procedure Step (MPPS) is Created as part of starting the acquisition of a new visit / study, new on that camera. The Atlantis AE 4 does NOT check whether a PPS was already created for a particular visit / study by another camera. The specific sequencing of messages is shown in Figure 12: Sequencing of MPPS Create.

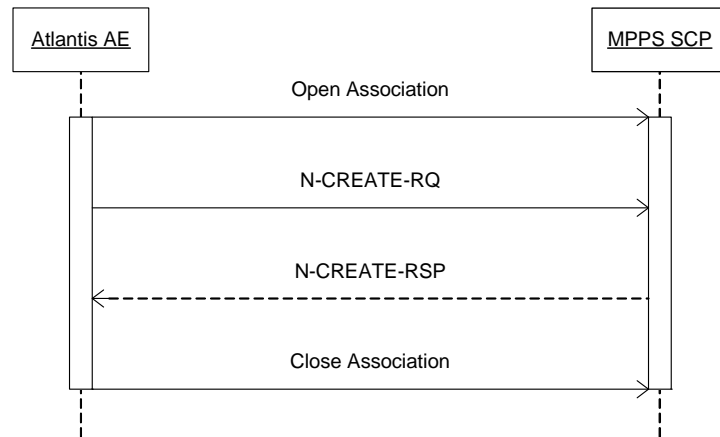


Figure 12: Sequencing of MPPS Create

A Modality Performed Procedure Step is Updated at the conclusion of acquisition for a visit / study. If all steps / series were acquired successfully, and no more steps are left in the schedule, then a Completed update is sent to the RIS. If not all steps / series were completed successfully, or the visit / study is Dismissed from the acquisition client before all steps / series have been acquired, then the acquisition client asks the user whether the MPPS status should be updated, and if so whether as Discontinued, or Completed, and then the appropriate messages are sent, as shown in Figure 13: Sequencing of MPPS Set. The inclusion of CT image Referenced SOP Instance UIDs in the Discontinued or Completed messages is not currently supported.

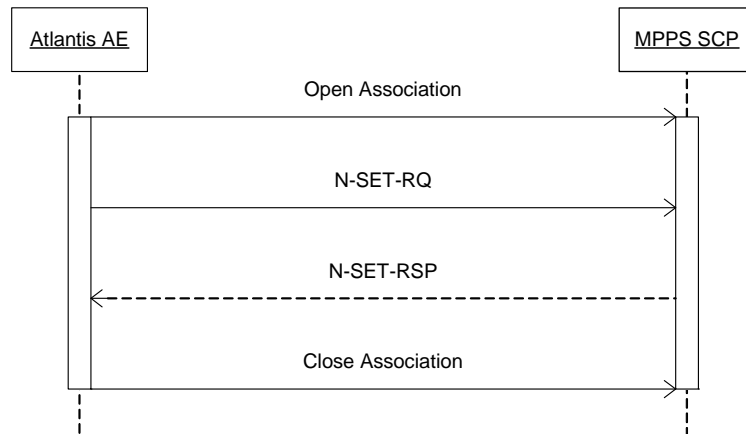


Figure 13: Sequencing of MPPS Set

4.2.4.3.2.2. Proposed Presentation Contexts

Each time an association is initiated, the association initiator proposes a number of presentation contexts to be used on that association. In this subsection, the presentation contexts proposed by Atlantis AE 4 for MPPS are defined in Table 47.

Table 47: Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

Any response to any other presentation context will be ignored.

4.2.4.3.2.3. SOP Specific Conformance for SOP Classes

4.2.4.3.2.3.1. Modality Performed Procedure Step Create and Set

All details regarding the specific conformance, including response behavior to all status codes, both from an application level and communication errors are provided in Table 48 and Table 49.

Table 48: DICOM N-CREATE Command Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Successful notification	No UI feedback, but status is logged in a log file.
Failure	0119	Class instance conflict	No UI feedback, but failure is logged to a log file.
	0210	Duplicate invocation	No UI feedback, but failure is logged to a log file.
	0115	Invalid argument value	No UI feedback, but failure is logged to a log file.
	0111	Invalid SOP Instance	No UI feedback, but failure is logged to a log file.
	0212	Mistyped argument	No UI feedback, but failure is logged to a log file.
	0114	No such argument	No UI feedback, but failure is logged to a log file.
	0113	No such event type	No UI feedback, but failure is logged to a log file.
	0118	No such SOP class	No UI feedback, but failure is logged to a log file.
	0112	No such SOP Instance	No UI feedback, but failure is logged to a log file.
	0110	Processing failure	No UI feedback, but failure is logged to a log file.
Communication failures	0213	Resource limitation	No UI feedback, but failure is logged to a log file.
	0211	Unrecognized operation	No UI feedback, but failure is logged to a log file.
		The Atlantis AE could not communicate with the peer DICOM station	No UI feedback, but error message is logged in log file.

Table 49: DICOM N-SET Command Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Successful notification	No UI feedback, but status is logged in a log file.
Failure	0119	Class instance conflict	No UI feedback, but failure is logged to a log file.
	0210	Duplicate invocation	No UI feedback, but failure is logged to a log file.
	0115	Invalid argument value	No UI feedback, but failure is logged to a log file.
	0111	Invalid SOP Instance	No UI feedback, but failure is logged to a log file.

Service Status	Code	Further Meaning	Behavior
	0212	Mistyped argument	No UI feedback, but failure is logged to a log file.
	0114	No such argument	No UI feedback, but failure is logged to a log file.
	0113	No such event type	No UI feedback, but failure is logged to a log file.
	0118	No such SOP class	No UI feedback, but failure is logged to a log file.
	0112	No such SOP Instance	No UI feedback, but failure is logged to a log file.
	0110	Processing failure	No UI feedback, but failure is logged to a log file.
	0213	Resource limitation	No UI feedback, but failure is logged to a log file.
	0211	Unrecognized operation	No UI feedback, but failure is logged to a log file.
Communication failures		The Atlantis AE could not communicate with the peer DICOM station	No UI feedback, but error message is logged in log file.

The following table lists the attributes supported by the Atlantis AE 4 in the Modality Performed Procedure Step IOD. The inclusion of CT image Referenced SOP Instance UIDs in the N-SET messages is not currently supported. The values used in the "Presence of Value in Create" and "Presence of Value in Set" columns are defined in the first Annex: 8.1.1.

Table 50: List of attributes in the MPPS IOD

Attribute Name	Tag	VR	Value	Presence of Value in Create	Presence of Value in Set	Source
Specific Character Set	0008,0005	CS	ISO_IR 100	ALWAYS	NEVER	FIXED
Performed Procedure Step Relationship				ALWAYS	NEVER	
Scheduled Step Attribute Sequence	0040,0270	SQ		ALWAYS	NEVER	
>Study Instance UID	0020,000D	UI		ALWAYS	NEVER	MWL, AUTO
>Referenced Study Sequence	0008,1110	SQ		VNAP	NEVER	MWL
>>Referenced SOP Class UID	0008,1150	UI		ALWAYS	NEVER	MWL
>>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	NEVER	MWL
>Accession Number	0008,0050	SH		VNAP	NEVER	MWL, USER
>Requested Procedure ID	0040,1001	SH		VNAP	NEVER	MWL
>Requested Procedure Code Sequence	0032,1064	SQ		ANAP	NEVER	MWL
>>Code Value	0008,0100	SH		ALWAYS	NEVER	MWL
>>Coding Scheme Designator	0008,0102	SH		ALWAYS	NEVER	MWL
>>Code Meaning	0008,0104	LO		ALWAYS	NEVER	MWL
>Requested Procedure Description	0032,1060	LO		VNAP	NEVER	MWL
>Scheduled Procedure Step ID	0040,0009	SH		VNAP	NEVER	MWL
>Scheduled Procedure Step Description	0040,0007	LO		VNAP	NEVER	MWL
>Scheduled Protocol Code Sequence	0040,0008	SQ		VNAP	NEVER	MWL
>>Code Value	0008,0100	SH		ALWAYS	NEVER	MWL
>>Coding Scheme Designator	0008,0102	SH		ALWAYS	NEVER	MWL
>>Code Meaning	0008,0104	LO		ALWAYS	NEVER	MWL
Patient's Name	0010,0010	PN		VNAP	NEVER	MWL, USER
Patient ID	0010,0020	LO		VNAP	NEVER	MWL, USER, AUTO
Patient's Birth Date	0010,0030	DA		VNAP	NEVER	MWL, USER
Patient's Sex	0010,0040	CS		VNAP	NEVER	MWL, USER
Referenced Patient Sequence	0008,1120	SQ		EMPTY	NEVER	
Performed Procedure Step Information				ALWAYS	ALWAYS	
Performed Procedure Step ID	0040,0253	SH		ANAP	NEVER	MWL
Performed Station AE Title	0040,0241	AE		ALWAYS	NEVER	CONFIG

Attribute Name	Tag	VR	Value	Presence of Value in Create	Presence of Value in Set	Source
Performed Station Name	0040,0242	SH		ALWAYS	NEVER	CONFIG
Performed Location	0040,0243	SH		EMPTY	NEVER	
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	NEVER	AUTO
Performed Procedure Step Start Time	0040,0245	TM		ALWAYS	NEVER	AUTO
Performed Procedure Step Status	0040,0252	CS		ALWAYS	ALWAYS	IMPLICIT
Performed Procedure Step Description	0040,0254	LO		ANAP	ANAP	IMPLICIT
Performed Procedure Type Description	0040,0255	LO		ANAP	ANAP	IMPLICIT
Procedure Code Sequence	0008,1032	SQ		ANAP	ANAP	MWL
>Code Value	0008,0100	SH		ANAP	ANAP	MWL
>Coding Scheme Designator	0008,0102	SH		ANAP	ANAP	MWL
>Code Meaning	0008,0104	LO		ANAP	ANAP	MWL
Performed Procedure Step End Date	0040,0250	DA		EMPTY	ALWAYS	AUTO
Performed Procedure Step End Time	0040,0251	TM		EMPTY	ALWAYS	AUTO
Performed Procedure Step Discontinuation Reason Code Sequence	0040,0281	SQ		NEVER	ANAP	IMPLICIT
>Code Value	0008,0100	SH		NEVER	ANAP	IMPLICIT
>Coding Scheme Designator	0008,0102	SH		NEVER	ANAP	IMPLICIT
>Code Meaning	0008,0104	LO		NEVER	ANAP	IMPLICIT
Image Acquisition Results				ALWAYS	ALWAYS	
Modality	0008,0060	CS		ALWAYS	NEVER	IMPLICIT
Study ID	0020,0010	SH		ALWAYS	NEVER	MWL, USER
Performed Protocol Code Sequence	0040,0260	SQ		ANAP	ANAP	MWL
>Code Value	0008,0100	SH		ANAP	ANAP	MWL
>Coding Scheme Designator	0008,0102	SH		ANAP	ANAP	MWL
>Code Meaning	0008,0104	LO		ANAP	ANAP	NWL
Performed Series Sequence	0040,0340	SQ		VNAP	ALWAYS	IMPLICIT
>Performing Physician's Name	0008,1050	PN		VNAP	VNAP	MWL
>Protocol Name	0018,1030	LO		ALWAYS	ALWAYS	MWL, IMPLICIT
>Operator's Name	0008,1070	PN		EMPTY	EMPTY	
>Series Instance UID	0020,000E	UI		ALWAYS	ALWAYS	AUTO
>Series Description	0008,103E	LO		VNAP	VNAP	USER
>Retrieve AE Title	0008,0054	AE		VNAP	VNAP	CONFIG
>Referenced Image Sequence	0008,1140	SQ		VNAP	VNAP	AUTO
>>Referenced SOP Class UID	0008,1150	UI		ALWAYS	ALWAYS	IMPLICIT
>>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	ALWAYS	AUTO
>Referenced Non-Image Composite SOP Instance Sequence	0040,0220	SQ		EMPTY	EMPTY	

4.2.4.4. Association Acceptance Policy

The Atlantis AE 4 does not accept any associations.

4.3. Network Interfaces

4.3.1. Physical Network Interface

The BrightView X and XCT cameras provide DICOM 3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM 3.0 Standard. No OSI stack communications are provided with this implementation.

The DICOM implementation is indifferent to the physical network media. The only requirement is that it operates on top of the TCP/IP stack.

The default connection port is the Ethernet.

4.3.2. Additional Protocols

None.

4.4. Configuration

Configuration can be done by launching the `updateSystem` script that is present in the `/export/home/atlas/etc` directory.

Configuration files can be found in the following locations on the NM acquisition server:

```
/export/home/atlas/DicomJetConnect/mc3c/mc3apps
/export/home/atlas/DicomJetConnect/mc3java/config
/export/home/atlas/data/Facility.ADAC01/Systems
/export/home/atlas/data/Facility.ADAC01/Worklist
/export/home/atlas/data/Facility.ADAC01/Cstore
```

For the BrightView XCT and upgraded BrightView X cameras **only**, configuration files can be found in the following locations on the CT acquisition and reconstruction computer:

```
C:\Program Files\Philips\XtraVision\Fixed Data\Merge
C:\Program Files\Philips\XtraVision\Fixed Data\Params
D:\XtraVision\Config
```

4.4.1. AE Title/Presentation Address Mapping

4.4.1.1. Local AE Titles

The local AE title mapping and configuration shall be specified. The following table shall be used:

Table 51: AE Title Configuration Table

Application Entity	Default AE Title	Default TCP/IP Port
Atlantis AE 1	No default	104 – outbound 3320 - inbound
Atlantis AE 2	No default	104
Atlantis AE 3	No default	104
Atlantis AE 4	No default	104

4.4.1.2. Remote AE Title/Presentation Address Mapping

Configuration of remote host names and port numbers shall be specified here.

The DICOM configuration requires the following information from the remote RIS:

HostName	The hostname of the RIS system.
HostIP	The IP address of the RIS system.
AE Title	The AE Title of the RIS system.
Port	The remote DICOM store service Port.

Name The name of Remote DICOM service.

Refer to the BrightView X or BrightView XCT Installation and Configuration Guide for information on configuring the JETStream Acquisition System.

4.4.2. Parameters

The specification of important operational parameters, their default value and range (if configurable) are presented here. The following table shall be used.

Table 52: Configuration Parameters table

Parameter	Configurable	Default Value
General Parameters		
Time-out waiting for acceptance or rejection Response to an Association Open Request. (Application Level timeout)	Yes	30s
General DIMSE level time-out values	No	
Time-out waiting for reply to associate request	Yes	60s
Time-out waiting for response to TCP/IP connect request. (Low-level timeout)	Yes	15s
Time-out waiting for acceptance of a TCP/IP message over the network. (Low-level timeout)	Yes	15s
Time-out for waiting for data between TCP/IP packets. (Low-level timeout)	Yes	15s
Any changes to default TCP/IP settings, such as configurable stack parameters.	No	
AE Specific Parameters		
Size constraint in maximum object size (see note 1)	No	
Maximum PDU size the AE can receive	Yes	28672
Maximum PDU size the AE can send	Yes	28672
AE specific DIMSE level time-out values	No	60 seconds
Number of simultaneous Associations by Service and/or SOP Class	No	5
<SOP Class support (e.g. Multi-frame vs. single frame vs. SC support), when configurable>	No	
<Transfer Syntax support, e.g. JPEG, Explicit VR, when configurable>	No	
Implementation Class UID	No	1.3.46.670589.28.1.1
Implementation Version	No	Atlantis710R01

5. MEDIA INTERCHANGE

BrightView X and XCT cameras do not support any media for image interchange.

6. SUPPORT OF CHARACTER SETS

The following character sets are supported.

Table 53: Supported DICOM Character Sets

Character Set Description	Defined Term	ESC Sequence	ISO Registration Number	Code Element	Character Set
Single-byte Character Sets without Code Extensions					
Default repertoire	-	-	ISO-IR 6	G0	ISO 646
Latin alphabet No. 1	ISO_IR 100	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 100	G1	Supplementary set of ISO 8859

There is no provision to configure character sets.

The behavior when an unsupported character set is received is untested and hence unknown.

For display purposes the characters are converted to Unicode.

7. SECURITY

7.1. Security Profiles

The Atlantis AEs do not support any security profiles.

7.2. Association Level Security

The Atlantis AEs do provide association level security, allowing associations only to configured systems and from configured AE titles.

7.3. Application Level Security

The Atlantis AEs do not support any application level security.

8. ANNEXES

8.1. IOD Contents

8.1.1. Created SOP Instances

This section specifies each IOD created (including private IOD's).

The following abbreviations are used for the IOD tables:

ALWAYS the module is always present
 CONDITIONAL the module is used under specified condition

The following abbreviations are used for the module tables:

ALWAYS the attribute is always present with a value
 EMPTY the attribute is always present without any value (attribute sent zero length)
 VNAP the attribute is always present and its Value is Not Always Present (attribute sent zero length if no value is present)
 ANAP the attribute is present under specified condition – if present then it will always have a value
 ANAPCV the attribute is present under specified condition – if present then its Value is Not Always Present (attribute sent zero length if condition applies and no value is present)
 ANAPEV the attribute is present under specified condition – if present then it will not have any value

The following abbreviations are used for the source of the data values in the tables:

AUTO the attribute value is generated automatically
 CONFIG the attribute value source is a configurable parameter
 COPY the attribute value source is another SOP instance
 FIXED the attribute value is hard-coded in the application
 IMPLICIT the attribute value source is a user-implicit setting
 MPPS the attribute value source is a Modality Performed Procedure Step
 MWL the attribute value source is a Modality Worklist
 USER the attribute value source is explicit user input

8.1.1.1. NM Image IOD

The following table lists the attributes supported by the Atlantis AE in the NM Image IOD.

Table 54: List of attributes in the NM Image IOD

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient Module				ALWAYS	
Patient's Name	0010,0010	PN		VNAP	MWL, USER
Patient ID	0010,0020	LO		VNAP	MWL, USER, AUTO
Patient's Birth Date	0010,0030	DA		VNAP	MWL, USER
Patient's Birth Time	0010,0032	TM		ANAP	MWL
Patient's Sex	0010,0040	CS		VNAP	MWL, USER

Attribute Name	Tag	VR	Value	Presence of Value	Source
Other Patient Ids	0010,1000	LO		ANAP	MWL
Ethnic Group	0010,2160	SH		ANAP	MWL
Patient Comments	0010,4000	LT		ANAP	MWL
Patient Medical Module				CONDITIO NAL	
Medical Alerts	0010,2000	LO		ANAP	MWL
Contrast Allergies	0010,2110	LO		ANAP	MWL
Pregnancy Status	0010,21C0	US		ANAP	MWL
Special Needs	0038,0050	LO		ANAP	MWL
Patient State	0038,0500	LO		ANAP	MWL
General Study Module				ALWAYS	
Study Instance UID	0020,000D	UI		ALWAYS	AUTO, MWL
Study Date	0008,0020	DA		ALWAYS	MWL, AUTO
Study Time	0008,0030	TM		ALWAYS	MWL, AUTO
Referring Physician's Name	0008,0090	PN		VNAP	MWL, USER
Study ID	0020,0010	SH		VNAP	MWL, USER
Accession Number	0008,0050	SH		VNAP	MWL, USER
Study Description	0008,1030	LO		ANAP	MWL
Referenced Study Sequence	0008,1110	SQ		ANAP	MWL
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	MWL
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	MWL
Procedure Code Sequence	0008,1032	SQ		ANAP	MWL
>Code Value	0008,0100	SH		ALWAYS	MWL
>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL
>Code Meaning	0008,0104	LO		ALWAYS	MWL
Patient Study Module				ALWAYS	
Patient's Age	0010,1010	AS		VNAP	IMPLICIT
Patient's Size	0010,1020	DS		ANAP	MWL, USER
Patient's Weight	0010,1030	DS		ANAP	MWL, USER
Additional Patient History	0010,21B0	LT		ANAP	MWL
General Series Module				ALWAYS	
Modality	0008,0060	CS	NM	ALWAYS	FIXED
Series Instance UID	0020,000E	UI		ALWAYS	AUTO
Series Number	0020,0011	IS		VNAP	AUTO
Laterality	0020,0060	CS		ANAP	IMPLICIT
Series Date	0008,0021	DA		ALWAYS	AUTO
Series Time	0008,0031	TM		ALWAYS	AUTO
Performing Physician's Name	0008,1050	PN		ANAP	MWL
Protocol Name	0018,1030	LO		ANAP	MWL, IMPLICIT
Series Description	0008,103E	LO		ANAP	USER
Operator's Name	0008,1070	PN		ANAP	USER
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ANAP	AUTO
>Referenced SOP Class UID	0008,1150	UI	1.2.840.10008.3.1.2.3.3	ALWAYS	FIXED
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO
Related Series Sequence	0008,1250	SQ		ANAP	IMPLICIT
>Study Instance UID	0020,000D	UI		ALWAYS	AUTO, MWL
>Series Instance UID	0020,000E	UI		ALWAYS	AUTO
>Purpose of Reference Code Sequence	0040,A170	SQ		ALWAYS	IMPLICIT
>>Code Value	0008,0100	SH		ALWAYS	IMPLICIT
>>Coding Scheme Designator	0008,0102	SH		ALWAYS	IMPLICIT

Attribute Name	Tag	VR	Value	Presence of Value	Source
>>Code Meaning	0008,0104	LO		ALWAYS	IMPLICIT
Body Part Examined	0018,0015	CS		ANAP	IMPLICIT
Patient Position	0018,5100	CS		ANAPCV	IMPLICIT
Smallest Pixel Value in Series	0028,0108	US		ANAP	AUTO
Largest Pixel Value in Series	0028,0109	US		ANAP	AUTO
Request Attributes Sequence	0040,0275	SQ		ALWAYS	MWL
>Requested Procedure ID	0040,1001	SH		ANAP	MWL
>Accession Number	0008,0050	SH		ANAP	MWL, USER
>Study Instance UID	0020,000D	UI		ANAP	AUTO, MWL
>Requested Procedure Description	0032,1060	LO		ANAP	MWL
>Requested Procedure Code Sequence	0032,1064	SQ		ANAP	MWL
>>Code Value	0008,0100	SH		ALWAYS	MWL
>>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL
>>Code Meaning	0008,0104	LO		ALWAYS	MWL
>Reason for the Requested Procedure	0040,1002	LO		ANAP	MWL
>Scheduled Procedure Step ID	0040,0009	SH		ANAP	MWL
>Scheduled Procedure Step Description	0040,0007	LO		ANAP	MWL
>Scheduled Protocol Code Sequence	0040,0008	SQ		ANAP	MWL
>>Code Value	0008,0100	SH		ALWAYS	MWL
>>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL
>>Code Meaning	0008,0104	LO		ALWAYS	MWL
Scheduled Procedure Step Start Date	0040,0002	DA		ANAP	MWL
Scheduled Procedure Step Start Time	0040,0003	TM		ANAP	MWL
Scheduled Performing Physician's Name	0040,0006	PN		ANAP	MWL
Scheduled Station Name	0040,0010	SH		ANAP	MWL
Reason for the Requested Procedure	0040,1002	LO		ANAP	MWL
Names of the Intended Recipients of Results	0040,1010	PN		ANAP	MWL
Requested Procedure Comments	0040,1400	LT		ANAP	MWL
Imaging Service Request Comments	0040,2400	LT		ANAP	MWL
Performed Procedure Step ID	0040,0253	SH		ANAP	MWL
Performed Procedure Step Start Date	0040,0244	DA		ANAP	AUTO
Performed Procedure Step Start Time	0040,0245	TM		ANAP	AUTO
Performed Procedure Step Description	0040,0254	LO		ANAP	MWL
Performed Protocol Code Sequence	0040,0260	SQ		ANAP	MWL
>Code Value	0008,0100	SH		ALWAYS	MWL
>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL
>Code Meaning	0008,0104	LO		ALWAYS	MWL
NM/PET Patient Orientation Module				ALWAYS	
Patient Orientation Code Sequence	0054,0410	SQ		VNAP	IMPLICIT
>Code Value	0008,0100	SH		ALWAYS	IMPLICIT
>Coding Scheme Designator	0008,0102	SH		ALWAYS	IMPLICIT
>Code Meaning	0008,0104	LO		ALWAYS	IMPLICIT
>Patient Orientation Modifier Code Sequence	0054,0412	SQ		ANAP	IMPLICIT
>>Code Value	0008,0100	SH		ALWAYS	IMPLICIT
>>Coding Scheme Designator	0008,0102	SH		ALWAYS	IMPLICIT
>>Code Meaning	0008,0104	LO		ALWAYS	IMPLICIT
Patient Gantry Relationship code sequence	0054,0414	SQ		VNAP	IMPLICIT

Attribute Name	Tag	VR	Value	Presence of Value	Source
>Code Value	0008,0100	SH		ALWAYS	IMPLICIT
>Coding Scheme Designator	0008,0102	SH		ALWAYS	IMPLICIT
>Code Meaning	0008,0104	LO		ALWAYS	IMPLICIT
General Equipment Module				ALWAYS	
Manufacturer	0008,0070	LO	Philips Healthcare	VNAP	FIXED
Institution Name	0008,0080	LO		ANAP	CONFIG
Station Name	0008,1010	SH		ANAP	CONFIG
Manufacturer's Model Name	0008,1090	LO		ANAP	CONFIG
Device Serial Number	0018,1000	LO		ANAP	CONFIG
Software Version(s)	0018,1020	LO		ANAP	CONFIG
Spatial Resolution	0018,1050	DS		ANAP	CONFIG
General Image Module				ALWAYS	
Instance Number	0020,0013	IS		VNAP	AUTO
Patient Orientation	0020,0020	CS		ANAPCV	IMPLICIT
Image Date	0008,0023	DA		ALWAYS	AUTO
Image Time	0008,0033	TM		ALWAYS	AUTO
Acquisition Number	0020,0012	IS		ANAP	AUTO
Acquisition Date	0008,0022	DA		ALWAYS	AUTO
Acquisition Time	0008,0032	TM		ALWAYS	AUTO
Images in Acquisition	0020,1002	IS	0	ALWAYS	FIXED
Quality Control Image	0028,0300	CS		VNAP	IMPLICIT
Burned in Annotation	0028,0301	CS		EMPTY	FIXED
NM Image Module				ALWAYS	
Image Type	0008,0008	CS		ALWAYS	IMPLICIT
Image ID	0054,0400	SH		ANAP	USER
Counts Accumulated	0018,0070	IS		VNAP	AUTO
Acquisition Termination Condition	0018,0071	CS		VNAP	IMPLICIT
Table Height	0018,1130	DS		ANAP	AUTO
Table Traverse	0018,1131	DS		ANAP	AUTO, USER
Actual Frame Duration	0018,1242	IS		ANAP	AUTO, USER
Count Rate	0018,1243	IS		ANAP	AUTO
Corrected Image	0028,0051	CS		ANAP	IMPLICIT
Whole Body Technique	0018,1301	CS		ANAP	IMPLICIT
Scan Velocity	0018,1300	DS		ANAP	USER
Scan Length	0018,1302	IS		ANAP	USER
Trigger Source or Type	0018,1061	LO		ANAPCV	IMPLICIT
Image Pixel Module				ALWAYS	
Rows	0028,0010	US		ALWAYS	USER
Columns	0028,0011	US		ALWAYS	USER
Pixel Representation	0028,0103	US	0	ALWAYS	FIXED
Pixel Data	7FE0,0010	OW		ALWAYS	AUTO
Smallest Image Pixel Value	0028,0106	US		ALWAYS	AUTO
Largest Image Pixel Value	0028,0107	US		ALWAYS	AUTO
NM Image Pixel Module				ALWAYS	
Samples per Pixel	0028,0002	US	1	ALWAYS	FIXED
Photometric Interpretation	0028,0004	CS	MONOCHROME2	ALWAYS	FIXED
Bits Allocated	0028,0100	US	16	ALWAYS	FIXED
Bits Stored	0028,0101	US	16	ALWAYS	FIXED
High Bit	0028,0102	US	15	ALWAYS	FIXED
Pixel Spacing	0028,0030	DS		ALWAYS	IMPLICIT

Attribute Name	Tag	VR	Value	Presence of Value	Source
Acquisition Context Module				CONDITIONAL	
Acquisition Context Sequence	0040,0555	SQ		ALWAYS	USER
>Value Type	0040,A040	CS	CODE	ALWAYS	FIXED
>Concept Name Code Sequence	0040,A043	SQ		ALWAYS	IMPLICIT
>>Code Value	0008,0100	SH	109055	ALWAYS	FIXED
>>Coding Scheme Designator	0008,0102	SH	DCM	ALWAYS	FIXED
>>Code Meaning	0008,0104	LO	Patient State	ALWAYS	FIXED
>Concept Code Sequence	0040,A168	SQ		ALWAYS	IMPLICIT
>>Code Value	0008,0100	SH		ALWAYS	IMPLICIT
>>Coding Scheme Designator	0008,0102	SH		ALWAYS	IMPLICIT
>>Code Meaning	0008,0104	LO		ALWAYS	IMPLICIT
Multi-frame Module				ALWAYS	
Number of Frames	0028,0008	IS		ALWAYS	IMPLICIT
NM Multi-frame Module				ALWAYS	
Frame Increment Pointer	0028,0009	AT		ALWAYS	AUTO
Energy Window Vector	0054,0010	US		ANAP	AUTO
Number of Energy Windows	0054,0011	US		ALWAYS	USER
Detector Vector	0054,0020	US		ANAP	AUTO
Number of Detectors	0054,0021	US		ALWAYS	USER
Phase Vector	0054,0030	US		ANAP	AUTO
Number of Phases	0054,0031	US		ANAP	USER
Rotation Vector	0054,0050	US		ANAP	AUTO
Number of Rotations	0054,0051	US		ANAP	USER
R-R Interval Vector	0054,0060	US		ANAP	AUTO
Number of R-R Intervals	0054,0061	US		ANAP	FIXED
Time Slot Vector	0054,0070	US		ANAP	AUTO
Number of Time Slots	0054,0071	US		ANAP	USER
Angular View Vector	0054,0090	US		ANAP	AUTO
Time Slice Vector	0054,0100	US		ANAP	AUTO
NM Isotope Module				ALWAYS	
Energy Window Information Sequence	0054,0012	SQ		ALWAYS	IMPLICIT
>Energy Window Name	0054,0018	SH		ALWAYS	AUTO
>Energy Window Range Sequence	0054,0013	SQ		ALWAYS	IMPLICIT
>>Energy Window Lower Limit	0054,0014	DS		ALWAYS	IMPLICIT
>>Energy Window Upper Limit	0054,0015	DS		ALWAYS	IMPLICIT
Radiopharmaceutical Information Sequence	0054,0016	SQ		ALWAYS	IMPLICIT
>Radionuclide Code Sequence	0054,0300	SQ		ALWAYS	IMPLICIT
>>Code Value	0008,0100	SH		ALWAYS	IMPLICIT
>>Coding Scheme Designator	0008,0102	SH		ALWAYS	IMPLICIT
>>Code Meaning	0008,0104	LO		ALWAYS	IMPLICIT
>Radiopharmaceutical Volume	0018,1071	DS	0.0	ANAP	FIXED
>Radiopharmaceutical Start Time	0018,1072	TM		ANAP	USER
>Radiopharmaceutical Stop Time	0018,1073	TM		EMPTY	FIXED
>Radionuclide Total Dose	0018,1074	DS		ANAP	USER
>Radiopharmaceutical	0018,0031	LO		ANAP	USER
>Radiopharmaceutical Code Sequence	0054,0304	SQ		ANAP	IMPLICIT
>>Code Value	0008,0100	SH		ALWAYS	IMPLICIT
>>Coding Scheme Designator	0008,0102	SH		ALWAYS	IMPLICIT
>>Code Meaning	0008,0104	LO		ALWAYS	IMPLICIT

Attribute Name	Tag	VR	Value	Presence of Value	Source
NM Detector Module				ALWAYS	
Detector Information Sequence	0054,0022	SQ		ALWAYS	IMPLICIT
>Collimator/grid Name	0018,1180	SH		ALWAYS	IMPLICIT
>Collimator Type	0018,1181	CS		ALWAYS	IMPLICIT
>Field of View Shape	0018,1147	CS	RECTANGLE	ALWAYS	FIXED
>Field of View Dimension(s)	0018,1149	IS		ANAP	IMPLICIT
>Focal Distance	0018,1182	IS	0	ALWAYS	FIXED
>X Focus Center	0018,1183	DS	0.0	ALWAYS	FIXED
>Y Focus Center	0018,1184	DS	0.0	ALWAYS	FIXED
>Zoom Center	0028,0032	DS	0.0	ALWAYS	FIXED
>Zoom Factor	0028,0031	DS		ANAP	IMPLICIT
>Center of Rotation Offset	0018,1145	DS	0.0	ALWAYS	FIXED
>Gantry/Detector Tilt	0018,1120	DS		ANAP	AUTO
>Start Angle	0054,0200	DS		ANAP	IMPLICIT
>Radial Position	0018,1142	DS		ANAP	AUTO
>Image Orientation (Patient)	0020,0037	DS		VNAP	IMPLICIT
>Image Position (Patient)	0020,0032	DS		VNAP	IMPLICIT
>View Code Sequence	0054,0220	SQ		ANAP	IMPLICIT
>>Code Value	0008,0100	SH		ALWAYS	IMPLICIT
>>Coding Scheme Designator	0008,0102	SH		ALWAYS	IMPLICIT
>>Code Meaning	0008,0104	LO		ALWAYS	IMPLICIT
>View Modifier Code Sequence	0054,0222	SQ		ANAP	IMPLICIT
>>Code Value	0008,0100	SH		ALWAYS	IMPLICIT
>>Coding Scheme Designator	0008,0102	SH		ALWAYS	IMPLICIT
>>Code Meaning	0008,0104	LO		ALWAYS	IMPLICIT
NM TOMO Acquisition Module				CONDITIO NAL	
Rotation Information Sequence	0054,0052	SQ		ANAP	IMPLICIT
>Start Angle	0054,0200	DS		ALWAYS	USER
>Angular Step	0018,1144	DS		ALWAYS	IMPLICIT
>Rotation Direction	0018,1140	DS		ALWAYS	USER, IMPLICIT
>Scan Arc	0018,1143	DS		ALWAYS	USER
>Actual Frame Duration	0018,1242	IS		ALWAYS	USER, AUTO
>Radial Position	0018,1142	DS		ALWAYS	AUTO
>Distance Source to Detector	0018,1110	DS		ANAP	FIXED
>Number of Frames in Rotation	0054,0053	US		ALWAYS	USER
>Table Traverse	0018,1131	DS		ALWAYS	AUTO, USER
>Table Height	0018,1130	DS		ALWAYS	AUTO
Type of Detector Motion	0054,0202	CS		ALWAYS	USER
NM Multi-gated Acquisition Module				CONDITIO NAL	
Beat Rejection Flag	0018,1080	CS		ANAP	IMPLICIT
PVC Rejection	0018,1085	LO		ANAP	IMPLICIT
Skip Beats	0018,1086	IS		ANAP	AUTO
Heart Rate	0018,1088	IS		ANAP	AUTO
Gated Information Sequence	0054,0062	SQ		ALWAYS	IMPLICIT
>Trigger Time	0018,1060	DS	0.0	ALWAYS	FIXED
>Data Information Sequence	0054,0063	SQ		ALWAYS	IMPLICIT
>>Frame Time	0018,1063	DS		ALWAYS	USER, IMPLICIT
>>Nominal Interval	0018,1062	IS		ANAP	AUTO
>>Low R-R Value	0018,1081	IS		ANAP	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
>>High R-R Value	0018,1082	IS		ANAP	AUTO
>>Intervals Acquired	0018,1083	IS		ALWAYS	AUTO
>>Intervals Rejected	0018,1084	IS		ANAP	AUTO
>>Time Slot Information Sequence	0054,0072	SQ		ALWAYS	IMPLICIT
>>>Time Slot Time	0054,0073	DS		ALWAYS	IMPLICIT
NM Phase Module				CONDITIO NAL	
Phase Information Sequence	0054,0032	SQ		ANAP	IMPLICIT
>Phase Delay	0054,0036	IS	0	ALWAYS	FIXED
>Actual Frame Duration	0018,1242	IS		ALWAYS	USER, AUTO
>Pause Between Frames	0054,0038	IS	0	ALWAYS	FIXED
>Number of Frames in Phase	0054,0033	US		ALWAYS	USER
>Number of Triggers In Phase	0054,0211	US	0	ALWAYS	FIXED
SOP Common Module				ALWAYS	
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.20	ALWAYS	FIXED
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO
Specific Character Set	0008,0005	CS	ISO_IR 100	ALWAYS	FIXED
Instance Creation Date	0008,0012	DA		ALWAYS	AUTO
Instance Creation Time	0008,0013	TM		ALWAYS	AUTO
Instance Creator UID	0008,0014	UI		ALWAYS	CONFIG

The following table lists the private attributes in the NM Image IOD of the Atlantis AE.

Table 55: List of private attributes in the NM Image IOD

Attribute Name	Tag	VR	Value	Presence of Value	Source
Private Data Creator Element	7051,0010	LO	PHILIPS NM -Private	ALWAYS	FIXED
Current Segment	7051,1000	US		ALWAYS	AUTO
Number of Segments	7051,1001	US		ALWAYS	USER
Segment Start Position	7051,1002	FL		ALWAYS	USER
Segment Stop Position	7051,1003	FL		ALWAYS	IMPLICIT
Rel. COR offset - X dir.	7051,1004	FL		ALWAYS	CONFIG
Rel. COR offset - Z dir.	7051,1005	FL		ALWAYS	CONFIG
Current Rotation Number	7051,1006	US		ALWAYS	AUTO
Number of Rotations	7051,1007	US		ALWAYS	USER
Alignment Translations	7051,1010	DS		ANAP	CONFIG
Alignment Rotations	7051,1011	DS		ANAP	CONFIG
Alignment Timestamp	7051,1012	DS		ALWAYS	CONFIG
Related Xray Series Instance UID	7051,1015	UI		ANAP	AUTO

8.1.1.2. SC Image IOD

The following table lists the attributes supported by the Atlantis AE in the SC Image IOD. The Atlantis AE only creates single frame SC Images.

Table 56: List of attributes in the SC Image IOD

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient Module				ALWAYS	

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient's Name	0010,0010	PN		VNAP	MWL, USER
Patient ID	0010,0020	LO		VNAP	MWL, USER, AUTO
Patient's Birth Date	0010,0030	DA		VNAP	MWL, USER
Patient's Birth Time	0010,0032	TM		ANAPCV	MWL
Patient's Sex	0010,0040	CS		VNAP	MWL, USER
General Study Module				ALWAYS	
Study Instance UID	0020,000D	UI		ALWAYS	AUTO, MWL
Study Date	0008,0020	DA		ALWAYS	MWL, AUTO
Study Time	0008,0030	TM		VNAP	MWL, AUTO
Referring Physician's Name	0008,0090	PN		VNAP	MWL, USER
Study ID	0020,0010	SH		VNAP	MWL, USER
Accession Number	0008,0050	SH		VNAP	MWL, USER
Study Description	0008,1030	LO		ANAP	MWL, USER
Name of Physician(s) Reading Study	0008,1060	PN		ANAP	USER
General Series Module				ALWAYS	
Series Instance UID	0020,000E	UI		ALWAYS	AUTO
Series Number	0020,0011	IS		VNAP	AUTO
Series Date	0008,0021	DA		ALWAYS	AUTO
Series Time	0008,0031	TM		ALWAYS	AUTO
Protocol Name	0018,1030	LO		ANAP	MWL, IMPLICIT
Series Description	0008,103E	LO		ANAP	USER
Body Part Examined	0018,0015	CS		ANAP	IMPLICIT
Patient Position	0018,5100	CS		ANAPCV	IMPLICIT
Request Attributes Sequence	0040,0275	SQ		ALWAYS	MWL
>Requested Procedure ID	0040,1001	SH		ANAP	MWL
>Scheduled Procedure Step ID	0040,0009	SH		ANAP	MWL
>Scheduled Procedure Step Description	0040,0007	LO		ANAP	MWL
>Scheduled Protocol Code Sequence	0040,0008	SQ		ANAP	MWL
>>Code Value	0008,0100	SH		ALWAYS	MWL
>>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL
>>Code Meaning	0008,0104	LO		ALWAYS	MWL
Performed Procedure Step ID	0040,0253	SH		ANAP	MWL
Performed Procedure Step Start Date	0040,0244	DA		ANAP	AUTO
Performed Procedure Step Start Time	0040,0245	TM		ANAP	AUTO
Performed Procedure Step Description	0040,0254	LO		ANAP	MWL
Performed Protocol Code Sequence	0040,0260	SQ		ANAP	MWL
>Code Value	0008,0100	SH		ALWAYS	MWL
>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL
>Code Meaning	0008,0104	LO		ALWAYS	MWL
General Equipment Module				ALWAYS	
Manufacturer	0008,0070	LO	Philips Nuclear Medicine	ALWAYS	FIXED
Institution Name	0008,0080	LO		ANAP	CONFIG
Institution Address	0008,0081	ST		ANAPCV	CONFIG
Station Name	0008,1010	SH		ANAP	CONFIG
Institutional Department Name	0008,1040	LO		ANAP	CONFIG
Manufacturer's Model Name	0008,1090	LO		ANAP	CONFIG
Device Serial Number	0018,1000	LO		ANAP	CONFIG

Attribute Name	Tag	VR	Value	Presence of Value	Source
Software Version(s)	0018,1020	LO		ANAP	CONFIG
Spatial Resolution	0018,1050	DS		ANAP	CONFIG
SC Equipment Module				ALWAYS	
Conversion Type	0008,0064	CS	WSD	ALWAYS	FIXED
Modality	0008,0060	CS	NM	ALWAYS	FIXED
Secondary Capture Device ID	0018,1010	LO		ANAP	CONFIG
Secondary Capture Device Manufacturer	0018,1016	LO	Philips Healthcare	ALWAYS	FIXED
Secondary Capture Device Manufacturer's Model name	0018,1018	LO		ANAP	CONFIG
Secondary Capture Device Software Version(s)	0018,1019	LO		ANAP	CONFIG
General Image Module				ALWAYS	
Instance Number	0020,0013	IS		VNAP	AUTO
Patient Orientation	0020,0020	CS		ANAPCV	IMPLICIT
Image Date	0008,0023	DA		ANAP	AUTO
Image Time	0008,0033	TM		ANAP	AUTO
Image Type	0008,0008	CS	DERIVED PRIMARY	ALWAYS	FIXED
Acquisition Date	0008,0022	DA		ANAP	AUTO
Acquisition Time	0008,0032	TM		ANAP	AUTO
Image Comments	0020,4000	LT		EMPTY	
Quality Control Image	0028,0300	CS		VNAP	IMPLICIT
Burned In Annotation	0028,0301	CS		ANAP	IMPLICIT
Lossy Image Compression	0028,2110	CS	00	ALWAYS	FIXED
Presentation LUT Shape	2050,0020	CS	IDENTITY	ALWAYS	FIXED
SC Image Module				ALWAYS	
Date of Secondary Capture	0018,1012	DA		ALWAYS	AUTO
Time of Secondary Capture	0018,1014	TM		ALWAYS	AUTO
Image Pixel Module				ALWAYS	
Samples per Pixel	0028,0002	US	1 or 3	ALWAYS	FIXED (1 for MONOCHROME2 and 3 for RGB)
Photometric Interpretation	0028,0004	CS	MONOCHROME2 or RGB	ALWAYS	USER
Rows	0028,0010	US		ALWAYS	AUTO
Columns	0028,0011	US		ALWAYS	AUTO
Bits Allocated	0028,0100	US	8	ALWAYS	FIXED
Bits Stored	0028,0101	US	8	ALWAYS	FIXED
High Bit	0028,0102	US	7	ALWAYS	FIXED
Pixel Representation	0028,0103	US	0	ALWAYS	FIXED
Pixel Data	7FE0,0010	OW		ALWAYS	AUTO
Planar Configuration	0028,0006	US	0	ANAP (only Present for RGB)	FIXED
Pixel Aspect Ratio	0028,0034	IS		ALWAYS	AUTO
Data Set Trailing Padding	FFFC,FFFC	OB		ANAP	AUTO
Modality LUT Module				ALWAYS	
Rescale Intercept	0028,1052	DS	0	ALWAYS	FIXED
Rescale Slope	0028,1053	DS	1	ALWAYS	FIXED
Rescale Type	0028,1054	LO	US	ALWAYS	FIXED
VOI LUT Module					
Window Center	0028,1050	DS	(only Present for MONOCHROME2)	CONDITIONAL	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
Window Width	0028,1051	DS		ALWAYS	AUTO
SOP Common Module				ALWAYS	
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.7	ALWAYS	FIXED
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO
Specific Character Set	0008,0005	CS	ISO_IR 100	ALWAYS	FIXED
Instance Creation Date	0008,0012	DA		ALWAYS	AUTO
Instance Creation Time	0008,0013	TM		ALWAYS	AUTO

The following table lists the private attributes in the SC Image IOD of the Atlantis AE.

Table 57: List of private attributes in the SC Image IOD

Attribute Name	Tag	VR	Value	Presence of Value	Source
Private Data Creator Element	2001,0010	LO		ALWAYS	AUTO
Examination Source	2001,1063	CS	ELSEWHERE	ALWAYS	FIXED

8.1.1.3. CT Image IOD

The following table lists the attributes supported by the Atlantis AE in the CT Image IOD.

This IOD applies to the BrightView XCT and upgraded BrightView X cameras **only**.

Table 58: List of attributes in the CT Image IOD

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient Module				ALWAYS	
Patient's Name	0010,0010	PN		VNAP	MWL, USER
Patient ID	0010,0020	LO		VNAP	MWL, USER, AUTO
Patient's Birth Date	0010,0030	DA		VNAP	MWL, USER
Patient's Sex	0010,0040	CS		VNAP	MWL, USER
General Study Module				ALWAYS	
Study Instance UID	0020,000D	UI		ALWAYS	AUTO, MWL
Study Date	0008,0020	DA		ALWAYS	MWL, AUTO
Study Time	0008,0030	TM		ALWAYS	MWL, AUTO
Referring Physician's Name	0008,0090	PN		VNAP	MWL, USER
Study ID	0020,0010	SH		VNAP	MWL, USER
Accession Number	0008,0050	SH		VNAP	MWL, USER
Study Description	0008,1030	LO		ANAP	MWL
General Series Module				ALWAYS	
Modality	0008,0060	CS	CT	ALWAYS	FIXED
Series Instance UID	0020,000E	UI		ALWAYS	AUTO
Series Number	0020,0011	IS		VNAP	AUTO
Series Date	0008,0021	DA		ALWAYS	AUTO
Series Time	0008,0031	TM		ALWAYS	AUTO
Performing Physician's Name	0008,1050	PN		ANAP	MWL
Series Description	0008,103E	LO		ANAP	USER
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ANAP	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
>Referenced SOP Class UID	0008,1150	UI	1.2.840.10008.3.1.2.3.3	ALWAYS	FIXED
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO
Body Part Examined	0018,0015	CS		ANAP	IMPLICIT
Patient Position	0018,5100	CS		ANAPCV	IMPLICIT
Request Attributes Sequence	0040,0275	SQ		ALWAYS	MWL
>Requested Procedure ID	0040,1001	SH		ANAP	MWL
>Scheduled Procedure Step ID	0040,0009	SH		ANAP	MWL
>Scheduled Procedure Step Description	0040,0007	LO		ANAP	MWL
Performed Procedure Step ID	0040,0253	SH		ANAP	MWL
Performed Procedure Step Start Date	0040,0244	DA		ANAP	AUTO
Performed Procedure Step Start Time	0040,0245	TM		ANAP	AUTO
Performed Procedure Step Description	0040,0254	LO		ANAP	MWL
Frame of Reference Module				ALWAYS	
Frame of Reference UID	0020,0052	UI		ALWAYS	AUTO
Position Reference Indicator	0020,1040	LO		EMPTY	
General Equipment Module				ALWAYS	
Manufacturer	0008,0070	LO	Philips Healthcare	ALWAYS	FIXED
Institution Name	0008,0080	LO		ANAP	CONFIG
Station Name	0008,1010	SH		ANAP	CONFIG
Manufacturer's Model Name	0008,1090	LO		ANAP	CONFIG
Device Serial Number	0018,1000	LO		ANAP	CONFIG
Software Version(s)	0018,1020	LO		ANAP	CONFIG
Spatial Resolution	0018,1050	DS		ANAP	IMPLICIT
General Image Module				ALWAYS	
Instance Number	0020,0013	IS		VNAP	AUTO
Acquisition Date	0008,0022	DA		ALWAYS	AUTO
Acquisition Time	0008,0032	TM		ALWAYS	AUTO
CT Image Module				ALWAYS	
Image Type	0008,0008	CS	DERIVED SECONDARY AXIAL	ALWAYS	FIXED
Samples per Pixel	0028,0002	US	1	ALWAYS	FIXED
Photometric Interpretation	0028,0004	CS	MONOCHROME2	ALWAYS	FIXED
Bits Allocated	0028,0100	US	16	ALWAYS	FIXED
Bits Stored	0028,0101	US	16	ALWAYS	FIXED
High Bit	0028,0102	US	15	ALWAYS	FIXED
Rescale Intercept	0028,1052	DS		ALWAYS	AUTO
Rescale Slope	0028,1053	DS		ALWAYS	AUTO
KVP	0018,0060	DS		ALWAYS	IMPLICIT
Acquisition Number	0020,0012	IS		ALWAYS	AUTO
Data Collection Diameter	0018,0090	DS		ALWAYS	CONFIG
Reconstruction Diameter	0018,1100	DS		ALWAYS	CONFIG
Distance Source to Detector	0018,1110	DS		ALWAYS	CONFIG
Distance Source to Patient	0018,1111	DS		ALWAYS	CONFIG
Table Height	0018,1130	DS		ALWAYS	IMPLICIT
Rotation Direction	0018,1140	CS		ALWAYS	IMPLICIT
Exposure Time	0018,1150	IS		ALWAYS	IMPLICIT
X-Ray Tube Current	0018,1151	IS		ALWAYS	USER
Exposure	0018,1152	IS		ALWAYS	IMPLICIT
Filter Type	0018,1160	SH		ALWAYS	CONFIG
Focal Spot	0018,1190	DS		ALWAYS	CONFIG

Attribute Name	Tag	VR	Value	Presence of Value	Source
Revolution Time	0018,9305	FD		ALWAYS	IMPLICIT
CTDIvol	0018,9345	FD		ALWAYS	IMPLICIT
Image Plane Module				ALWAYS	
Pixel Spacing	0028,0030	DS		ALWAYS	IMPLICIT
Image Orientation (Patient)	0020,0037	DS		ALWAYS	IMPLICIT
Image Position (Patient)	0020,0032	DS		ALWAYS	IMPLICIT
Slice Thickness	0018,0050	DS		ALWAYS	USER, IMPLICIT
Slice Location	0020,1041	DS		ALWAYS	AUTO
Image Pixel Module				ALWAYS	
Rows	0028,0010	US		ALWAYS	USER
Columns	0028,0011	US		ALWAYS	USER
Pixel Representation	0028,0103	US	0	ALWAYS	FIXED
Pixel Data	7FE0,0010	OW		ALWAYS	AUTO
Contrast/Bolus Module				ALWAYS	
Contrast/Bolus Agent	0018,0010	LO		EMPTY	
VOI LUT Module				ALWAYS	
Window Center	0028,1050	DS		ALWAYS	AUTO
Window Width	0028,1051	DS		ALWAYS	AUTO
SOP Common Module				ALWAYS	
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.2	ALWAYS	FIXED
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO
Specific Character Set	0008,0005	CS	ISO_IR 100	ALWAYS	FIXED

The following table lists the private attributes in the CT Image IOD of the Atlantis AE.

Table 59: List of private attributes in the CT Image IOD

Attribute Name	Tag	VR	Value	Presence of Value	Source
Private Data Creator Element	7051,0020	LO	PHILIPS XCT -Private	ALWAYS	FIXED
Attenuation threshold	7051,2001	DS		ALWAYS	CONFIG
DLP Estimate	7051,2002	DS		ALWAYS	IMPLICIT

8.1.2. Usage of Attributes from Received IODs

8.1.2.1. Modality Worklist Query IOD

See Table 39 for the list of attributes that the Atlantis AE supports from received IODs.

8.1.3. Attribute Mapping

Many of the attributes received via Modality Worklist are copied to the same attribute in the storage IOD. A few Worklist attributes are also copied to different attributes in the storage IOD, and these are summarized in Table 60.

Table 60: Attribute mapping between modality work list and storage IOD

Modality Worklist	Storage IOD
Scheduled Procedure Step ID	Performed Procedure Step ID

Modality Worklist	Storage IOD
Scheduled Procedure Step Description	Performed Procedure Step Description
Scheduled Protocol Code Sequence	Performed Protocol Code Sequence

8.1.4. Coerced/Modified fields

For all attributes with a VR of Person Name (PN), the Atlantis AE only supports the first Component Group. If the result of a Modality Worklist query includes attributes of VR = PN with more than one Component Group, only the values from the first Component Group will be copied to the associated NM and CT image headers. If the camera user supplies the values for an attribute of VR = PN (such as Patient's Name), the BrightView X and XCT cameras do not support entering values for more than the first Component Group, nor do they support explicitly entering values for middle name, name prefix, and name suffix.

8.2. Data Dictionary of Private Attributes

All NM images contain one or more private elements in the group 7051, "PHILIPS NM – Private". See the definition of attributes in the NM IOD in Section 8.1.1.1.

All SC images contain a couple private elements in the group 2001. See the definition of the attributes in the SC IOD in Section 8.1.1.2.

All CT images contain a private element in the group 7051, "PHILIPS XCT – Private". See the definition of attributes in the CT IOD in Section 8.1.1.3.

8.3. Coded Terminology and Templates

The Atlantis AE uses a number of standard context groups and some augmented defined terms.

8.3.1. Context Groups

Each Context Group (i.e., use of coded terminology in a specific context) used in the Atlantis AE is shown in Table 61. The mapping context group used for acquisition protocol selection is user configurable in the user console.

Table 61: Context Groups

Context Group	Default Value Set	Configurable	Use
Acquisition Protocol Selection	None	Replaceable	Value of Scheduled Procedure Step Description (0040,0007) from selected Modality Worklist Scheduled Procedure Step is matched to this group for equipment-specific protocol selection.
Isotope	CID 18	No	Mapped from user console selection of Energy Window Set. Used in the Radionuclide Code Sequence (0054,0300)
Patient Orientation	CID 19	No	Mapped from user console selection of Patient Orientation. Used in Patient Orientation Code Sequence (0054,0410)
Patient Orientation Modifier	CID 20	No	Mapped from user console selection of Patient Position. Used in Patient Orientation Modifier Code Sequence (0054,0412)
Gantry-Patient Relationship	CID 21	No	Mapped from user console selection of Patient Orientation and Patient Position. Used in Patient Gantry Relationship Code Sequence (0054,0414)
Detector Angulation	CID 23	No	Mapped from equipment position at the start of an acquisition and the user console selection of Patient Orientation. Used in View Modifier Code Sequence (0054,0222)

Context Group	Default Value Set	Configurable	Use
Radiopharmaceuticals	CID 25	No	Mapped from user console selection of Radiopharmaceutical. Used in Radiopharmaceutical Code Sequence (0054,0304)
NM Projection	CID 26	No	Mapped from equipment position at the start of an acquisition and the user console selection of Patient Orientation and Patient Position. Used in View Code Sequence (0054,0220)
Acquisition Context	CID 3101	No	Mapped from user console selection of Patient State. Used in Acquisition Context Sequence (0040,0555)
Purpose of Reference	CID 7210	No	Mapped from protocol parameters. Used in Related Series Sequence (0008,1250)
PPS Discontinuation Reason	CID 9300	No	

8.3.2. Defined terms

The Atlantis AE enhances the set of defined terms for several attributes. The table below lists the attributes and the set of additional terms used.

Table 62: Defined Terms

Attribute Name	Tag	Use
Body Part Examined	0018,0015	ADRENAL, BONE, brain, CARDIAC, CISTERNOGRAPHY, GALLIUM, GASTRIC, GIBLED, HIDA, I131, INDIUM, INFECTION, LIVER, LUNG, LYMPHOSCINTIGRAPHY, MAMMOSCINTIGRAPHY, MUGA, OTHER, PARATHYROID, RENAL, SHUNT, SPLEEN, THALLIUM, THYROID, TUMOR, WHOLEBODY

8.4. Grayscale Image consistency

Not Applicable.

8.5. Standard Extended/Specialized/Private SOPs

The Standard NM, SC, and CT SOP classes are extended. There are no private SOPs.

8.6. Private Transfer Syntaxes

Not applicable.