

DIGITAL MAMMOGRAPHY: HOLOGIC SELENIA™

Hands-On Training Course

Course Length: 3 Weeks
CEUs Awarded: 12 CEUs

Introduction

Mammography may be the most dynamic of all of today's imaging modalities. With the new regulatory and accreditation procedures, and advancements in technology, the service professional is becoming more involved in maintaining the quality of the mammographic images produced. This course is designed to give the service professional the insight to evaluate image quality problems, determine if the mammographic unit is the source of the image problem and take the appropriate steps to correct the deficiency.

Given today's regulatory environment maintaining the system at peak performance is of the utmost importance.

At the completion of this course students will be able to perform all Selenia system maintenance procedures including:

- System installation
- Calibration
- Gantry maintenance
- DROC maintenance
- Imaging chain maintenance
- Detector pixel mapping
- Preventive maintenance
- Troubleshooting

Prerequisites

To attend this course, the service professional must have attended Phase I and possess fundamental knowledge and understanding of the principles of X-ray and basic electronics.

Objectives

- Identify the major components of the Selenia system
- Describe the functional characteristics of each sub-system of the Selenia system
- Describe the factors that affect digital mammographic image quality
- Describe how those factors are optimized to produce the highest quality digital mammographic images
- Complete all operator, administration, and application tasks
- Fully install the Selenia system and related components
- Describe the function of the basic components of the Hologic Selenia mammographic unit
- Perform the necessary tests to reproduce the results of the physicist's report to confirm corrective action
- Perform all system calibrations and adjustments to maintain the highest quality images and compliance with MQSA requirements
- Perform detector related maintenance and Pixel mapping procedures to maintain detector image quality over time
- Demonstrate UNIX competence to be able to handle DROC maintenance, backup, restore, and calibrations
- Perform complete Preventive Maintenance procedures as performed by the OEM
- Evaluate circuit functions to facilitate troubleshooting

Course Outline

DAY 1

- I. Course introduction
- II. M-IV vs. Selenia comparison
- III. Selenia system
 - A. Components
 - B. Selenia terms/acronyms
 - C. System documentation
 - D. Manual set overview
- IV. System logins

Lab Activities

- I. Major system component identification
- II. System turn-on
- III. System logins
- IV. System power-down

DAY 2

- I. Mammographic regulatory overview
- II. Digital mammography technology overview
- III. Direct vs. indirect digital capture
- IV. Digital image quality factors:
 - A. DQE
 - B. Noise/SNR
 - C. Contrast
 - D. MTF
 - E. Spatial resolution
- V. Selenia quality control
- VI. Functional checks

Lab Activities

- I. Technologist QC checks
- II. Image quality
 - A. Resolution
 - B. Contrast
- III. Signal to noise
- IV. MTF
- V. Flatfield/Phantom IQ

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DAY 3

- I. Selenia system basic operation
- II. Physicist evaluation testing
- III. Physicist evaluation corrective action

Lab Activities

- I. X-Ray to light congruence
- II. kVP accuracy
- III. HVL
- IV. AEC accuracy
- V. Tube output
- VI. Phantom image quality
- VII. Signal to noise ratio (SNR)
- VIII. Detector ghosting

DAY 4

- I. System power
 - A. AWS
 - B. Gantry
 - C. Brick
 - D. Detector
 - E. Turn-on circuits
- II. System communications
 - A. AWS
 - B. Sun blade computer
 - C. Fiber optic interface
 - D. Brick
 - E. Gantry
 - F. Detector
 - G. X-Ray controls

Lab Activities

- I. Remove and replace covers and system panels
- II. Component identification
 - A. AWS
 - B. Gantry
 - C. Brick
 - D. Detector
- III. Component location
 - A. Schematic location
 - B. Physical location
 - C. Connector locations
 - D. Fuse location/identification

DAY 5

- I. Selenia operations
- II. AWS acquisition software
- III. Operators console
- IV. User interface/application
 - A. Image acquisition
 - B. Image viewer
 - C. Screen considerations

Lab Activities

- I. Patient scheduling
- II. Patient database
- III. Adding views
- IV. Changing output devices
- V. Acquiring images

DAY 6

- I. Specifications
 - A. System specs
 - B. Detector specs
- II. Calibration overview
 - A. TEC
 - B. AEC
- III. Selenia networking
 - A. Network troubleshooting
 - B. FTP
 - C. Networking configuration
- IV. Remote access to Selenia

Lab Activities

- I. TEC exposure examples and HTC grid
- II. AEC exposure examples and HTC grid
- III. Configure selenia networking components
- IV. Configure service laptop to communicate with Selenia remotely
- V. Troubleshoot Selenia remotely
- VI. View Selenia system logs remotely

DAY 7

- I. UNIX Command
 - A. Basics
 - B. Advanced
- II. Selenia Sun Solaris OS
- III. Selenia file system
 - A. Selenia scripts
 - B. Selenia configuration files
 - C. Permissions
 - D. File editing
- IV. CDE

Lab Activities

- I. UNIX Commands
 - A. Basic
 - B. Advanced
- II. Navigate Solaris file system
 - A. Locate user config files
 - B. Locate detector config files
 - C. Locate calibration and backup scripts
 - D. Change file permissions
- III. Editor
- IV. Navigate CDE

DAY 8

- I. Selenia DICOM
- II. Selenia services
- III. Selenia DX SOP's
- IV. Selenia transfer syntax
- VI. Selenia DICOM conformance
- III. System administration
- IV. Required tools and test equipment
- V. Required software

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Lab Activities

- I. Image directory
- II. DICOM viewer
- III. Transfer calibration images to service laptop

DAY 9

- I. Site planning/pre-installation
- II. AWS configuration
- III. Network configuration
- IV. Output devices
 - A. CDRW
 - B. Review station
 - C. PACS
 - D. Laser printer
 - E. CAD
- V. Device/output configuration
- VI. Input devices
 - A. Barcode scanner
 - B. Modality worklist

Lab Activities

- I. Pre-installation configuration
- II. Configure AWS
- III. Configure network settings
- IV. Configure and test output devices
- V. Configure and test input devices

DAY 10

- I. System integrity
- II. Backups
 - A. AWS
 - B. User preferences
 - C. Gantry/tubehead calibration data
 - D. Brick/AEC calibration data
- III. Restore system components from backup

Lab Activities

- I. Backup AWS
- II. Backup user preferences
- III. Backup gantry/tubehead calibration data
- IV. Backup brick/AEC calibration data
- V. Complete restore from backup

DAY 11

- I. System integrity cont'd
- II. Sun Solaris operating system installation procedure
- III. AWS application installation procedure

Lab Activities

- I. Clean Solaris OS install
- II. Application install
- III. System restore from previous backup

DAY 12

- I. System service
- II. System calibration
 - A. kV regulation
 - B. Filament control
 - C. Rotor control
 - D. Motor controls
 - E. VTA
 - F. Collimator
 - G. Tubehead
- III. AEC calibration

Lab Activities

- I. kV calibration
- II. mA calibration
- III. Tubehead Adjustments
- IV. AEC calibration

DAY 13

- I. Selenia imaging chain
- II. Image and detector maintenance
- III. Detector calibration
- IV. Pixel mapping

Lab Activities

- I. Detector flatfield calibration
- II. Pixel mapping individual bad pixels
- III. Pixel mapping detector lines
- IV. Recalibrate newly mapped detector

Note: Due to copyright laws, students are required to purchase and bring to class a copy of the Selenia manuals set. Contact your dealer to order the manual set if you do not have the documentation with your system.

Selenia Manual Set - P/N ASY-01516 includes:

- 1 Manual, Selenia S/W Manual for Operators (1)
- 1 Manual, Selenia H/W Manual for Operators (2)
- 1 Manual, Selenia Installation and H/W Maintenance
- 1 Manual, Selenia Calibration and S/W Maintenance
- 1 Manual, Selenia AEC Cal
- 1 Manual, Selenia Admin Guide (AEC)
- 1 Manual, Selenia QC (AEC)
- 1 Manual, Selenia V3.X Quick Reference (AEC)
- 1 Manual, Selenia Schematics
- 1 Addendum, Selenia Install, Techmate UPS

DAY 14

- I. Preventive maintenance
- II. Optional components:
 - A. Review workstation
 1. Softcopy workstation diagnostic review
 2. SecureView DX diagnostic review
 3. System overview
 4. Browser software
 5. Image viewer
 6. Hanging protocols
 - B. CAD
 - C. Modality worklist (MWL)
 - D. PACS
- III. Review system diagrams and communication
- IV. Review workstation utilities and service tools
- V. System schematics
 - A. AWS
 - B. Gantry
 - C. Imaging chain

Lab Activities

- I. Selenia PM worksheet
- II. Review workstation operation
- III. Configuring hanging protocols
- IV. Review workstation utilities and service tools
- V. Configure and test CAD

DAY 15

- I. Troubleshooting
- II. Error codes
- III. System diagnostics
- IV. Course review
- V. Course evaluation
- VI. Final exam