

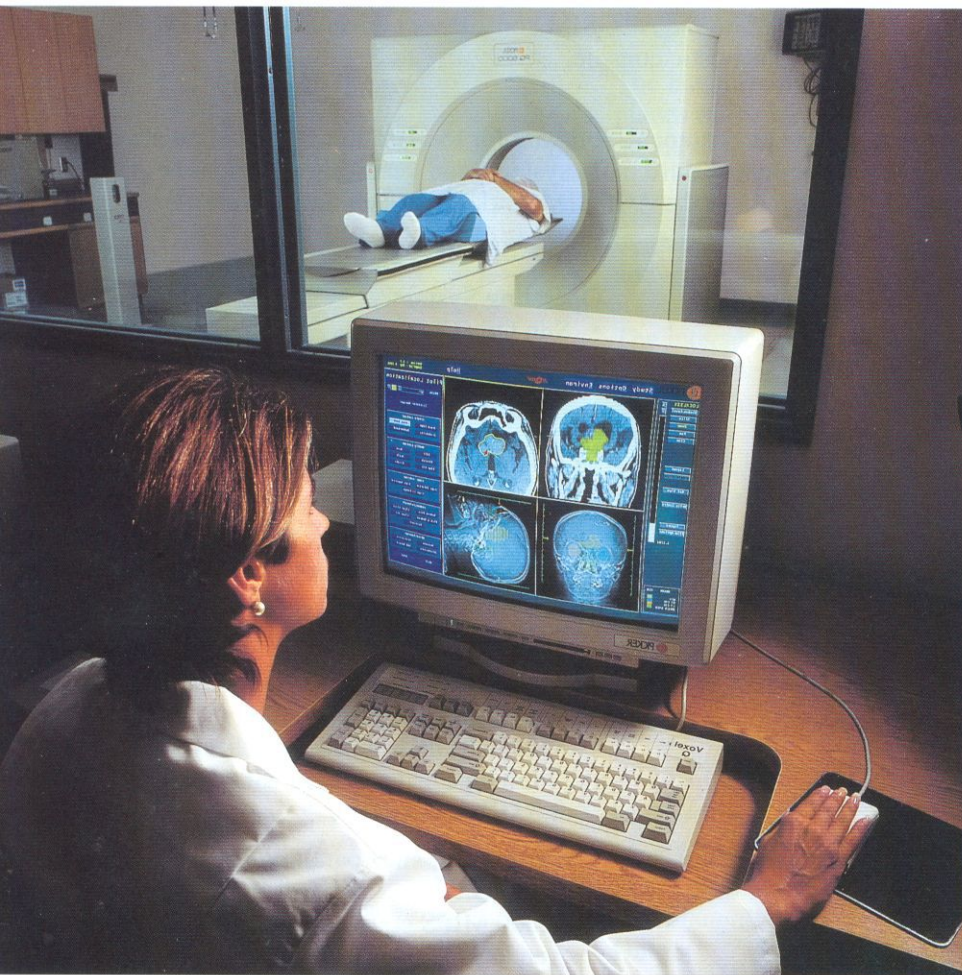


ACQSIM II

CT Simulation/Localization System



The most advanced CT simulation and geometric planning system available in the oncologic marketplace.



Description

ACQSIM features a state of the art CT scanner with a localization package, patient marking system and a virtual simulator capable of producing real-time digitally constructed radiographs (DCRs).

The system offers high-resolution imaging and short examination time for the full range of oncologic procedures including volumetric localization,

simulation and verification for conformal, high-precision and stereotactic radiotherapy planning.

ACQSIM's development is the result of a strategic partnership between Picker International and Varian Oncology Systems. Since its introduction in 1992, ACQSIM represents the largest installed base of 3-D CT simulation systems worldwide.

Product Data

Specifications

ACQSIM Base System Components

ACQSIM consists of one or more CT simulation workstations networked to any Picker Q-series CT scanner, a laser marking system and associated accessories which include a flat table insert and quality assurance devices. Through the use of optional networking software, ACQSIM may be connected to third party equipment such as RTP systems, portal imaging and conventional simulation systems, record and verify systems. (Refer to the ACQSIM Connectivity product data sheet for details.)

Dual/Dedicated

ACQSIM can be configured for dedicated oncology use or dual usage within diagnostic radiology. For systems configured for dual use purposes, a separate Voxel Q software license is required to allow diagnostic functions to be exercised on the ACQSIM console, or conversely ACQSIM functions on the diagnostic console.

MultiStation

In a multiconsole environment, software for localization, virtual simulation, export/import of data to third party systems and verification may all be accomplished from any of the ACQSIM workstations on the network.

Voxel Q CPU

- Sun SPARC host
- Operating System
 - Sun OS (Unix)
- Data Exchange
 - Ethernet (TCP/IP); AUI connector
- CPU Memory
 - 16 MBytes

Service and Applications Modem

- For remote diagnostics and software upgrades
- Internal Hayes compatible -28.8k baud

Data Storage Devices

- 2.0 GByte combined system/patient data disk
- Up to 4.0 GByte additional patient data disk
- 8mm tape drive system with 2.5 GBytes capacity

Voxel Q Image Processor

- Custom bit-slice parallel/pipeline architecture
- 1,000 MIPS equivalent performance for rendering
- 10 million TRIPS (trilinear interpolations per second)

Dataset Memory

- 64 MBytes standard (maximum 128MB optional)
- High-speed 8-way interleaved object memory

ACQSIM Operator's Console

- Full alphanumeric keyboard
- Template overlay
- 12 function keys; 6 hot keys; archive, delete; screen layout changes, etc.
- Mouse and mouse pad

Specifications

(continued)

Standard Printers

- HP DeskJet 400 (or equivalent)
- Lexmark 7091 HP/GL Postscript (or equivalent)

20" Color Display Monitor

- Full color 24-bit RGB image display plus 16-bit overlay
- 1408 x 1024 pixels displayed
- Up to 48 user-selectable independent or related viewports
- 60 Hz, non-interlaced refresh

Laser Light System Components

Patient marking is achieved with ACQSIM through the use of externally mounted axial, sagittal and coronal lasers. The system is comprised of three separate lasers, two fixed (laterally mounted) and one movable (sagittal unit).

The laterally mounted lasers allow for the definition of the axial and coronal planes of the localization reference planes by suitable, user defined movements of the table vertical and longitudinal motions.

The sagittal plane of the localization reference point (isocenter) is provided by the movable sagittal laser unit, which may be mounted on the ceiling above the table or on the far wall.

The intersection of the long laser lines in the axial, sagittal and coronal planes represents the geometric center of the target or field. All laser line markings have a precision of ± 1 mm.

Table vertical and longitudinal positions are manually set by the operator. The sagittal laser position is manually controlled via a remote keypad. This remote keypad/display is used to display positional information of the sagittal laser, providing user control for entry and movement of the sagittal laser and control of laser power. The keypad allows entry of positional information to 1mm and manual step movement to 0.1mm. In addition, the keypad allows the user to set isocenter, control laser illumination and positional speed. The keypad can be mounted either on tabletop surface or wall mounted using velcro strips.

Laser Diode Specifications

Type	Laserdiode - Line
Line Width	<2mm up to 4m distance
Line Length	2m at 3m distance (FOV = 33 degrees)
Wavelength	635nm
Output	<1mW CDRH Class II
Ambient Temp	0-40 degrees C
Range	Up to 7m
Stability	<0.1mm drift at 3m distance
Focus	1-7m
Line Rotation	± 7 degrees from intended axis
Power Consumption	<1W single laser (line)
Power supply	5 VDC
Shock Resistance	100g all axis
Lifetime	50,000 hours with constant output power

Laser Light System Components

(continued)

Laser Tracking Unit (Sagittal)

The laser tracking unit contains a single laser mounted on a linear rail with a motor drive and positioning controller. This motion allows the laser line to be precisely moved left or right of the scanner isocenter. Motion is controlled by isocenter coordinates entered manually on the keypad.

Angle Position	± 30 degrees
Lateral Movement	600mm line to line
Rotational Movement	±7 degrees
Tilt (1 plane)	± 3 degrees (laser - left/right)
Translational Movement (1 plane)	+25mm (mounting plate - horizontal only)
Dimensions	1100mm L x 180mm W x 125mm D
Weight	60 lbs. (27kg)

Side Lasers (Lateral)

The lateral lasers are comprised of two line lasers that are rotated to project both a horizontal and vertical line at the patient support. These lasers are mounted on an adjustable plate to allow complete adjustment of both beams. The lateral lasers provide access holes in the cover to allow minor beam adjustment. Lateral lasers are supplied with mounting plates to adapt to existing laser hole patterns.

Rotational Movement	± 7 degrees
Tilt (2 planes)	± 3.5 degrees (laser) ± 50 degrees (mounting plate - vertical only)
Translational Movement (2 planes)	± 12mm (laser) ± 25mm (mounting plate)
Dimensions	160mm L x 86mm W x 75mm D
Weight	4 lbs. (1.8kg)

Laser Alignment Package

The laser alignment package, consisting of a quality control phantom and software, serves as a calibration accuracy tool for the ACQSIM system.

Flat Table Pad

The flat table pad insert creates a flat surface to mimic the linear accelerator table. This simple insert provides the basis for the attachment of standard immobilization accessories which combined with the same or similar devices on the linac, allow for improved accuracy between CT simulation and daily treatment setup.

The ACQSIM table supports a maximum weight of 450 lbs. (202.5kg) evenly distributed. The deflection varies with total weight, loading and table extension. The deflection varies from about 1 to 2mm for a loading of 300 lbs. (35kg) to as much as 4mm at maximum loading with the table extended.

ACQSIM System Options

Software Options

- Multimodality registration and localization package
- Digitally composited radiograph (DCR) package
- RTP network and other licenses

Memory and Disk Upgrades

- Memory Options
- Upgrade to 128 MBytes

Data Storage Options

- Upgrade to 4.0 GByte disk system (total capacity)
- Upgrade to 6.0 GByte disk system (total capacity)

Interface Options

Networking

- HYPERLAN II
- ACR/NEMA DICOM 3.0
- Entry/MTE Ethernet converter
- MTE 1200 Ethernet converter
- Nuclear Interfile Data Link

Remote Slave Monitor

- Full image viewing capabilities
- 20-inch full color 24-bit RGB monitor
- Maximum distance from Voxel Q to control center: 50 feet (15.24m), without amplifiers

Printers

Color Printers

- Color dye sublimation 8 1/2 inch x 14 inch
- Color dye sublimation 11 inch x 17 inch
- Color laser 11 inch x 17 inch (color only up to 8 1/2 inch x 14 inch)

Archive Options

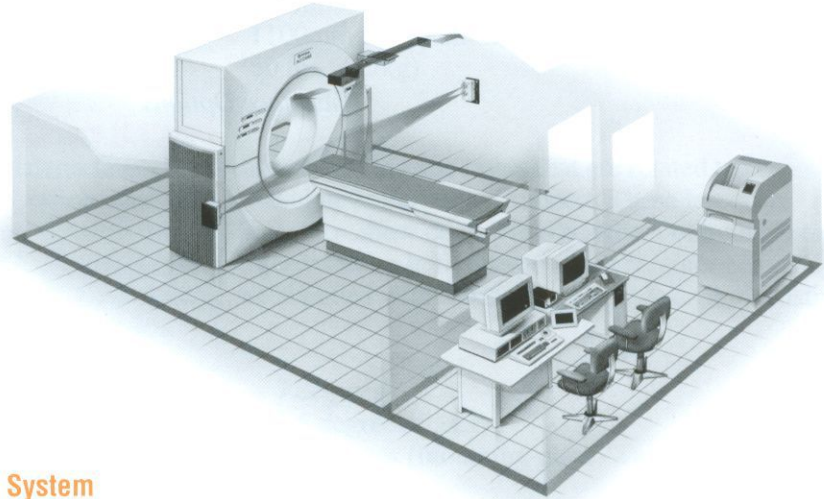
5-1/4 Optical Disk Archiver

- 5-1/4 inch optical disk drive
- Interface cables
- One media platter
- Housed in CPU tower enclosure
- 350 MByte capacity per media side
- Software to read archive tapes from Picker 1200 CT scanners (SS04 and Level II software) and Picker MR devices

Site Requirements

The site selection process is the first critical step in the acquisition and long-term success of any computed tomography (CT) system. Since ACQSIM includes a PQ-series scanner, siting requirements are similar to those presented in the PQ-Series Global Site Planning Guide with the addition of the laser light system and laser alignment package.

To make a final determination on the location of an ACQSIM system, refer to your local sales representative to enlist Picker Site Planning team resources. The Picker team of qualified site planners is dedicated to supporting the efficient, timely and successful installation of operating sites around the world.



CT System

Main Incoming Power Supply
 480 VAC (nominal) 75 kVa 3-phase distribution source, 50/60 Hz

Suggested Ambient Room Requirements

68 to 75 degrees at 30% to 60% R.H. (Noncondensing). Estimated btu/hr. Ratings below are based on an average hourly duty cycle and standby modes of equipment operation:

Exam Room	21,000 btu/hr.
Control Area	10,000 btu/hr.
Camera (optional)	2,200 btu/hr.
Total	33,200 btu/hr.

Recommended Ceiling Height

9 foot (2.74m) minimum

Floor Space

27m²

- One dedicated phone line for modem use.

ACQSIM Console

Electrical

- Standard 120 VAC 15 amp dedicated circuit (standard & 3-prong plug).
- Two dedicated phone lines for modem use (one for scanner, other for ACQSIM console)

Magnetic fields

Image quality may be affected by the proximity of magnetic fields.

Visualization Station Interface Options

- ACR/NEMA DICOM 3.0
- 9-track Magnetic Tape Drive

Equipment Schedule

Equipment	Width	Depth	Height	Weight
CT Console	24" (61cm)	28" (71cm)	58" (147cm)	425 lbs. (191 kg)
Gantry Stand	88" (224cm)	34" (86cm)	77" (196cm)	3400 lbs. (1530 kg)
Patient Couch	23" (58cm)	165" (419cm)	40" (102cm)	550 lbs. (248 kg)
Head Holder	—	—	—	—
Laser Imager	51" (130cm)	26" (66cm)	48" (122cm)	666 lbs. (300 kg)
ACQSIM Station (Voxel Q)	19" (48cm)	26" (66cm)	16" (41cm)	80 lbs. (36 kg)
ACQSIM Computer (Voxel Q)	9" (23cm)	30" (76cm)	29" (74cm)	170 lbs. (76 kg)
Side Laser Lights	5" (13cm)	5" (13cm)	8" (20cm)	8 lbs. (4 kg)
Sagittal Laser Lights	43" (109cm)	8" (20cm)	8" (20cm)	120 lbs. (54 kg)
Laser Light Control	10" (25cm)	8" (20cm)	5" (13cm)	5 lbs. (2.25 kg)
Film Viewers	—	—	—	—
HP Deskjet Printer	17" (43cm)	15" (38cm)	8" (20cm)	15 lbs. (7 kg)
Lexmark Printer	31" (79cm)	20" (51cm)	11" (28cm)	45 lbs. (20 kg)

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