

Acuity Cone-beam CT Acquisition and reconstruction tool

Enhancing the role of Acuity™ for simulation, verification, and planning, Varian introduces the **Acuity cone-beam CT** option.

Cone-beam CT augments Acuity with the capability of acquiring and reconstructing 15 cm of volumetric data in one gantry rotation.

Acuity combines conventional and CT simulation into one easy to use product. Acuity can quickly change from radiographic and fluoroscopic mode for isocenter localization to CT acquisition mode for treatment planning. This is accomplished with no movement of the patient from the actual treatment position.

Digital imaging on Acuity allows the operator to identify the area to be scanned by simply marking the top and bottom margins of the anatomy on the digital image. Acuity automatically sets up the correct mechanical positions and generator settings necessary to begin the scan acquisition.

Acquisition time is approximately 45 seconds. Reconstruction time is dependent on the slice thickness selected. It takes less than two



Acuity cone-beam CT—the next dimension for 3D volumetric acquisition.

minutes to reconstruct 2.5 mm slices for the entire volume.

As part of Varian's integrated oncology solutions, Inspiration™, together with ARIA™ oncology information system, and Eclipse™ integrated treatment planning, Acuity cone-beam CT image

data is immediately available for treatment planning and patient set-up verification.

Acuity cone-beam CT is available for any Acuity model and may be retrofitted on site.

Acuity Cone-beam CT Acquisition and reconstruction tool

Specifications

1.0 Software Features

- Window/level
- Pan/zoom
- Multiple image display
- HU Calibration
- Measurement tool
- Patient file management

2.0 Hardware

2.1 Acquisition workstation

- Pentium®-class computer
- 3.2 GHz single processor
- Minimum 4 GB RAM

2.2 Reconstruction computer

- Dell Precision™ 670 dual CPU Workstation or equivalent
- Dual 3.2 GHz Intel® Xeon™ CPUs; 800 MHz FSB
- 2 GB DDR2 RAM
- 160 GB Serial ATA 7200 RPM hard drive
- Windows® XP Professional operating system SP1 or later

2.3 CBCT Phantoms

- Body normalization phantom: 45 cm diameter
- Head normalization phantom: 25 cm diameter
- Geometry calibration phantom
- CT image quality phantom (e.g., Catphan 504 or equivalent)

2.4 Image performance specifications

See Table 1.

Table 1: Performance Specifications

Characteristic	Performance
CT Number Range	-1024 to +3072 or greater
CT Number Accuracy	± 40 HU for 20 cm diameter (water equivalent) phantom
Spatial Resolution	Axial = 7 lp/cm (measured using a full-fan acquisition with Catphan 504 phantom) Axial = 6 lp/cm (measured using a half-fan acquisition with Catphan 504 phantom)
Low Contrast Resolution	1.0%; 15 mm diameter object visible; using a dose of 90 mGy (CTDIw) in 20 cm Catphan 504 phantom using a 2.5 mm slice thickness
Noise	1.0% using a dose of 50 mGy (CTDIw) in a 20 cm H2O phantom using a 10 mm slice thickness
CT Number Uniformity (cupping)	±40 HU from center to edge in a 20 cm diameter uniform phantom (uniformity section of a Catphan 504 phantom)
CT Number Linearity	CT # versus true attenuation (μ) has a regression co-efficient of 0.95 for a four point calibration
Aperture Size	Approximately 95 cm
Reconstruction Field of View	25 cm dia. x 15 cm axial length (head scan) 45 cm dia. x 15 cm axial length (body scan)
Length of Image Volume	Three contiguous volumes of 15 cm can be merged via software to provide a volume length of approximately 45 cm.
Reconstruction Matrix	128 x 128, 256 x 256, 512 x 512
Image Display	1280 x 1024 x 8 bits
Slice Thickness	0.5 – 10 mm
Acquisition and Reconstruction Time	Acquisition time approximately 45 sec Reconstruction time approximately < 2 min for 2.5 mm slice width
Typical Doses	Body: 38 mGy (CTDIw) [@125 kVp and using bow-tie filter] Head: 90 mGy (CTDIw) [@125 kVp and using bow-tie filter]

Specifications subject to change without notice.

Varian and Varian Medical Systems are registered trademarks, and Acuity, ARIA, Eclipse, and Inspiration are trademarks of Varian Medical Systems, Inc. The names of other companies and products mentioned herein are used for identification purposes only and may be trademarks or registered trademarks of their respective owners.



USA Headquarters, California
Varian Medical Systems
Palo Alto, CA
Tel: 650.424.5700
800.544.4636
Fax: 650.493.5637
www.varian.com

Headquarters Europe, Eastern Europe, Africa, Middle & Near East
Varian Medical Systems International AG
Zug, Switzerland
Tel: 41.41.749.8844
Fax: 41.41.740.3340
info.europe@varian.com

The Acuity Cone-beam CT is part of the Inspiration™ integrated oncology environment.
Inspiration, the Varian advantage