

TomoScope® Synergy

The TomoScope® Synergy is a stand-alone in-vivo micro-CT scanner with short scan times, excellent low-contrast resolution and high spatial resolution dedicated to small animal imaging.

It is a lightweight and fully shielded desktop scanner that can be operated in any laboratory environment without additional x-ray shielding following official regulatory procedures. The spatial resolution of the system is in the order of 80 µm with a fixed geometry. The field of measurement has a diameter of up to 65 mm and maximum scan length of 15 cm, with shortest scan times down to 1 s.

It works on the same continuously rotating gantry principle as clinical CT scanners for humans. To allow for this, a slip ring connects the stationary part of the gantry with the detectors and the tubes which rotate around the motorized patient table. A sealed, small focus, medium power x-ray tube with a tungsten target and forced air cooling illuminates the object. Images are acquired by a 2-dimensional flat-panel detector.

Tomographic image reconstruction is based on the cone-beam Feldkamp algorithm. The high speed TomoScope® image reconstruction software is optimized for high image quality; it includes HU normalization, cupping and misalignment corrections and guarantees best dose usage. The software is implemented to work on standard PC hardware running Microsoft Windows operating systems. The image reconstruction allows for flexible reconstruction parameters, such as the choice of the size and of the number



of voxels of the volume to be reconstructed, or the choice of the reconstruction kernel depending on the application.

The TomoScope® Synergy series is optimized for bringing CT imaging into a multi-modality environment. Object bed adapters and customized image co-registration software allow for a best-in-class approach: you can combine the TomoScope® Synergy with the leading MR, PET/SPECT or optical imaging systems without drawbacks for image quality or workflow.

The TomoScope® Synergy Twin further extends the capabilities of the basic system and operates with two tubes and detectors, doubling the acquisition speed and temporal resolution and therefore is ideal for dynamic imaging. Also, the tubes are controlled independently from each other and thus sophisticated dual-energy applications become possible.

Specifications

Principle

Desktop micro-CT cone-beam scanner
Rotating gantry with stationary object
Slip ring technology
Two source-detector systems (*optional*)

Field of measurement

Diameter: up to 65 mm (*optional*)
Max. examination length: 150 mm

X-ray components

Tube voltage: 20 – 65 kV
Focal spot size: 50 µm

Detectors

One or two high speed flat-panel detectors with
CsI scintillator

Scan

- 1 s to 90 s scan time
up to 5 minutes for dynamic studies
- Circle and sequence scan mode
- Localizer image
- Multi-modality object bed adapters
- Free definition of scan protocols
- Low dose ranging from 10 mGy to typically 180 mGy

Reconstruction

- High speed cone-beam reconstruction in less than 30 s (*GPU, optional*) or 2 min (for 512³ voxels from 720 projections)
- Floating point precision
- Arbitrary matrix and voxel size
- Various reconstruction filters, cupping correction, HU-normalization

- Optional software packages for
 - retrospectively gated image reconstruction
 - dual-energy applications
 - multi-modality image co-registration

- Spatial resolution of 6 lp/mm (80 µm)

Other characteristics

- Integrated radiation shielding
- Dimensions: 75 cm × 88 cm × 112 cm
- Standard electrical outlet
(110 / 240 VAC, 20 / 10 A)
- Weight: 250 kg