spectral instruments imaging

MOLECUBES

THE LAGO **OPTICAL CT**

More than the Sum of its Parts

Industry Leading Optical + X-Ray CT Solution • High Throughput - 10-mouse BLI, FLI
Patented High Sensitivity LED FLI • Highest Resolution Bench-top X-Ray CT
Fully integrated operations • Seamless co-registration • Modular, Upgradeable

spectralinvivo.com

VivoQuant by Invicro

BREAKTHROUGH OPTICAL + CT

The Lago Optical CT is the best performing, cutting edge solution for combined Optical and CT. It is a fully integrated offering that builds on the best in class Lago in vivo optical imaging instrument (BLI, FLI) from Spectral Instruments Imaging and the ground-breaking X-Cube CT by Molecubes.

The Lago industry leading sensitivity and throughput. The X-Cube CTTM provides best-in-class performance and ease of use. VivoQuant™ by Invicro provides multimodal, post-processing software for image data viewing and analysis.

This combined solution delivers a seamless user experience across both the operational imaging of small animals (BLI, FLI and CT) as well as the co-registration of images across all modalities, without compromising the integrity of research outcomes.

The Lago Optical CT, with its combination of the Lago, XCube CT and VivoQuant software is superior to any other combined Optical + CT instrument*— in sensitivity, performance, reliability, flexibility, availability and upgradeability.

THE LAGO ADVANTAGE

The imaging system contains a high performance air cooled CCD camera (-90°C Absolute) to record the luminescence and fluorescence image(s) collected by a large aperture lens with automation for filter and field of view selection.

PATENTED HIGH SENSITIVITY LED BASED FLI

The cutting edge patented LED based illumination and faint signal detection provide unprecedented power and previously unattained sensitivity for FLI and BLI. The Lago is also well suited where early detection and marking disease progression is of value.

HIGH THROUGHPUT – 10 MICE BLI FLI

The Lago comes equipped with the largest native field of view (FOV) on the market based on comparable products from other vendors (ex: IVIS® Spectrum). The Lago provides an industry leading 25 cm x 25 cm field of view for BLI and FLI. This enables the Lago to provide an unprecedented and unmatched 10 mouse capacity across BLI and FLI. Thus the Lago is able to deliver High Throughput capability for critical vaccine research, oncology and other translational studies that also require large sample sizes.

THE X-CUBE CT ADVANTAGE

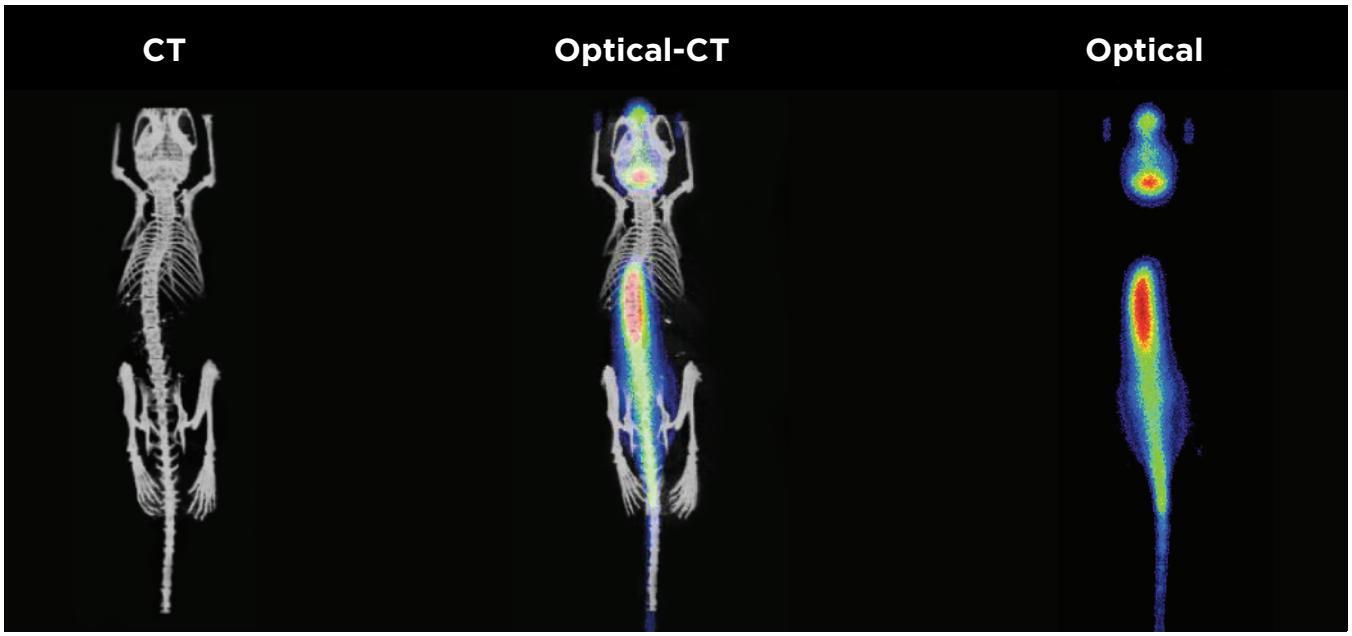
The Molecubes X-Cube CT delivers high-end performance without compromise. The X-Cube CT is a high throughput CT "work horse" enabling fast, whole-body mouse and rat CT imaging at extremely low dose, with excellent soft tissue contrast and up to 50 micron resolution. Light weight, thanks to a self-shielded imaging unit, it is a truly mobile in vivo scanner. Advanced workflows such as gated and dynamic contrast enhanced imaging can be achieved in a functional and integrated set up. The iterative reconstruction techniques are available in standard as well as expert user mode. Intuitive and wireless acquisition software combined with our multimodal small animal bed allow for easy and modular multimodal imaging.

THE INVICRO ADVANTAGE

VivoQuant™ is a DICOM compliant post-processing suite for image data combining fundamental viewing functionality with powerful analysis capabilities. VivoQuant ("VQ") supports data from most imaging modalities including MR, PET, SPECT, CT, and Optical. Multiple display modes including orthogonal views, slice views, special coregistration multi-views as well as 3D MIPs and volume renderings allow users to optimally view information of interest. Built-in features allow imaging scientists to extract the information they need with minimal effort, including powerful tools for fine-tuning images and isolating, drawing and analyzing 3D regions of interest. VivoQuant's integration with iPACS, a full image study data management platform, offers sophisticated data management, reporting and data sharing tools of VivoQuant-generated data.

LAGO OPTICAL CT – MORE THAN THE SUM OF ITS PARTS*

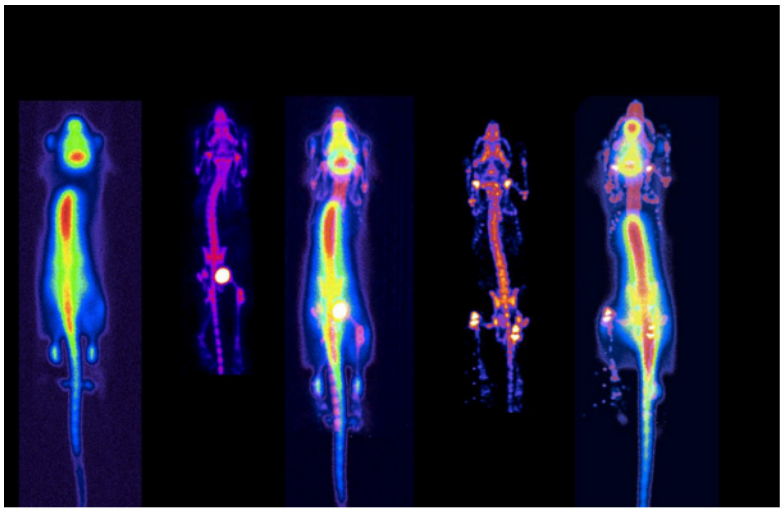
- **Higher throughput & availability**
    - 2 Mice Capacity for Combined Optical + CT
    - 10 mice for Optical - Up to 4 mice for CT
    - Compatible Animal Beds, Interoperable Software
    - Optical and CT can be operated in parallel
- **Field upgradeable (< ½ day)**
    - Lago - Add Access Port, X-Ray (10 mouse) easily.
    - X-Cube CT to PET/SPECT automated co-registration
- **Seamless Interoperability**
    - Compatible Animal Beds for Easy Transfer
    - Included VivoQuantTM Software
- *compare to SpectrumCT*



OPTICAL + CT DETECTION IDENTIFICATION OF BONE GROWTH PLATES IN MICE:

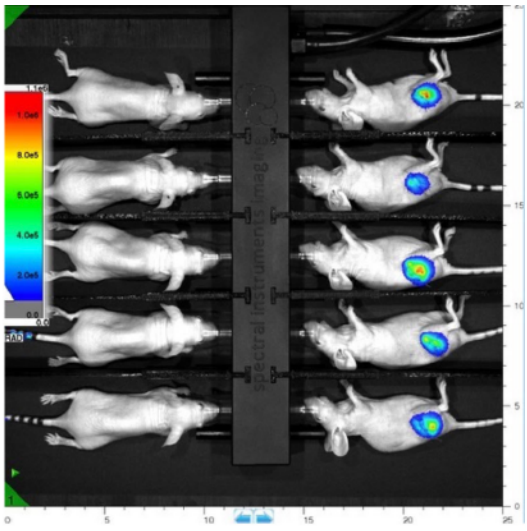
Mice treatment prior to imaging: *Nude female mice (Nu/Nu, 6 weeks, 18 grams) were given 100µl Osteosense 750* (IV, from PerkinElmer), and imaged 24 hours later. Lago optical camera settings: FLI: 5 sec, 2x2 binning, 2.0 f-stop, 745/810 nm excite/emit filter pair, and 20 cm x 20 cm FOV; Lago optical camera settings: Photo: 0.5 sec, no binning, 16.0 f-stop. CT imaging was performed for anatomical co-registration of the Optical datasets. X-Ray CT was acquired on the MOLECUBES X-CUBE (MOLECUBES NV), using both the General Purpose and the High Resolution protocols. The CT datasets were reconstructed using an iterative algorithm (ISRA) with a voxel size of 200 µm.

ALSO AVAILABLE FROM MOLECUBES: PET AND SPECT



All images in this brochure, unless otherwise mentioned, were acquired curtesy of The Integrated Small Animal Imaging Research Resource at The University of Chicago.

LAGO HIGH THROUGHPUT OPTICAL



Sharon S. Hori, Sheen-Woo Lee, Sanjiv Sam Gambhir (Canary Center at Stanford, Stanford University School of Medicine)

SPECIFICATIONS

Lago BLI, FLI (optional X-Ray)	
Modalities	Bioluminescence, Fluorescence, Cerenkov, X-Ray, more...
Mouse / Animal Capacity – BLI, FLI	10 mice, 2 Rats (included manifold)
Mouse / Animal Capacity – X-Ray	10 mice, 2 Rats (included manifold)
Calibration	Absolute, NIST Traceable
Camera Sensor	Back-illuminated, cooled CCD sensor
Pixel dimensions	2048x2048
High Performance CCD Size	27.6 x 27.6 mm
Quantum Efficiency	>85% from 500-700 nm, >30% from 400-850 nm
CCD Operating Temperature	-90°C Absolute, air cooled
Dark Current	<0.00009 e-/pixel/s**
Minimum Detectable Radiance	45 photons/sec/cm2/sr
Binning	1x1, 2x2, 4x4, 8x8, 16x16
Lens	50 mm, max aperture f/1.2, min f/16
Read Noise	2.5 e***
Imaging Field of View (FOV)	25x25 cm to 6x6 cm (5 Stops)
Fluorescence Excitation LEDs	14 from 360 nm to 805 nm
Fluorescence Emission Filter Slots	20
Fluorescence Emission Filters Available	20 from 490 nm to 870 nm
Custom Filters	Available on Request (for Plants too)
X-ray Source (Lago X)	10-50 keV
X-ray Field of View (Lago X)	25 x 22 cm
Space Requirements	56 cm wide, 66 cm deep, 211 cm high
System Internal Dimension	Imaging platform is 50x34 cm
Heated Imaging Platform	Standard feature
Gas Anesthesia	Inlet & Outlet Ports
Access Port	Yes
Field Upgrade Access Port	Yes
Field Upgrade X-Ray	Yes
Cooling Type	Solid State – No Leaks
Acquisition Hardware	Included PC with Monitor
Acquisition Software	Aura Software pre-loaded on PC
Analysis Software	Aura Software - Analysis (Mac & PC) available for free.

X-CUBE CT	
Modalities	CT (PET, SPECT modular, specifications separately)
Mouse Capacity	Up to 4
FOV Axial	200 mm
FOV Transaxial	65 mm
FOV maximal weight rats	450 gm
Image Resolution (nominal)	50 µm
Scan Mode	circular or helical
Shortest Mouse Scan Time (full body)	20 sec
Minimum Dose (mouse)	mouse < 4 mGy
Contrast Resolution	<20 HU
Type	flat-panel CMOS + CsI
Number of Pixels	864 x 1536 pixels
Pixel Size	74.8 µm
Scintillator crystal material	CsI
Crystal thickness	150 µm
Crystal type	Structured
Detectable Energy Range	35-120 keV
X-Ray kVp	20 - 80 kVp
X-Ray max current	500 µA
X-Ray maximum power	40 W
X-Ray Filter	0.8 mm Aluminum, fixed
X-Ray focal spot size	33 µm
X-Ray Warmup needed	no
X-Ray Anode type	Tungsten
X-Ray Window	1.4 mm glass, 3.6 mm polystyrene
X-Ray Duty cycle rating	100% (non-pulsating)
Software	VivoQuant Software (1 license)

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***Typical, 0.0003 e-/pixel/s maximum. ***Typical, 3.0 e maximum.*

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