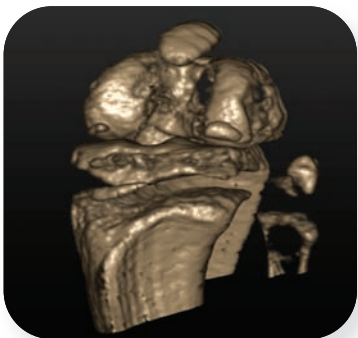
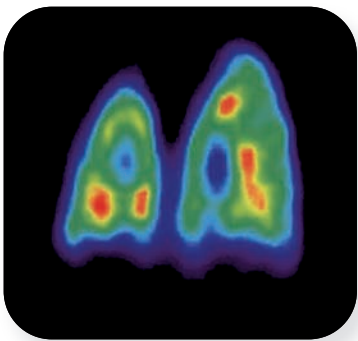
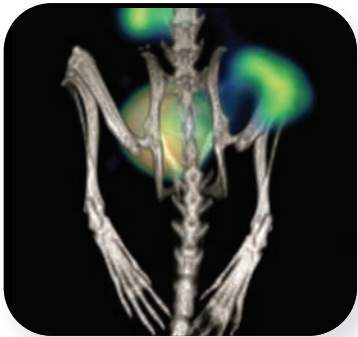


Carestream
Molecular Imaging



Albira

Revolutionary
PET
SPECT
CT
Imaging System



A revolution in PET/SPECT/CT imaging from the world's leading innovator in preclinical imaging systems.

Carestream Health is a strong, successful, multi-billion dollar, international company specializing in pre-clinical, clinical, and dental imaging systems and information technology. A highly respected innovator in molecular imaging solutions, we provide industry leading *in-vitro* and *in-vivo* digital imaging systems to our customers around the world. We were the first to offer an innovative combination of luminescence, fluorescence, radioisotopic, and radiographic imaging in a single, award-winning instrument specifically designed for the pre-clinical, small animal researcher.

But our customers demanded more.

Preclinical imaging researchers are vital to the future of patient care.

Like you, thousands of Carestream customers around the world rely on advanced imaging techniques to study dynamic biological process within living animals. To better understand the progression and treatment of diseases, they use imaging technologies as an important tool to measure and quantify results from studies – such as pharmacokinetics, pharmacodynamics, enzyme activity, protein expression, and perfusion – that provide insight into the underlying mechanisms.

While these researchers typically use model organisms such as mice and rats in their studies, their ultimate goal is to successfully translate their discoveries to the clinic, to improve treatments and outcomes for patients everywhere. So, to ensure that their research will readily translate to the clinical environment, our customers need to work with the same probes and imaging technologies that clinicians use to diagnose their patients today.

Knowing our unmatched imaging expertise, they demanded we find a way to meet this need. And we did.

Albira revolutionizes your research with unmatched image quality, contrast, and resolution.

Albira combines PET, SPECT, and CT imaging in a novel and extremely powerful way. The system's highly compact, multi-modal modular design gives you the freedom to purchase what you need now, and upgrade as your research needs evolve. The footprint never changes, and your capital investment is protected. But what makes Albira truly remarkable is an unprecedented advance in detector technology. Albira's unique detector system uses an exclusive, patented combination of single crystal detectors, PSPMTs and associated advanced electronics to deliver exquisite sensitivity with rapid acquisition of extremely high resolution, quantitative, precise, and accurate PET and SPECT images.

This represents a new, highly innovative alternative to the pixelated crystal technology used in other systems. Albira creates an entire new class of high resolution PET detectors with no dead zones to compromise sensitivity.

And that's not all! Albira is designed from the ground up to complement the way you work. You're going to love how Albira's seamless, end-to-end integration and powerful workflow propel your research forward with maximum accuracy and efficiency. From one-click multimodal acquisitions, rapid reconstructions and automatic image fusion to sophisticated data quantification and management, Albira's powerful, user-friendly software supports you every step of the way. Use the built-in protocols or customize them with just a few clicks.

Join the revolution!

Whether you are working to develop new predictive imaging biomarkers, accelerate preclinical validation of small or large molecules, better select ideal drug candidates for clinical translation, or gain a quantitative understanding of underlying biological processes, Albira's exciting new technology unlocks the full potential of your research. There's nothing else like it, and we are the only ones that offer it.

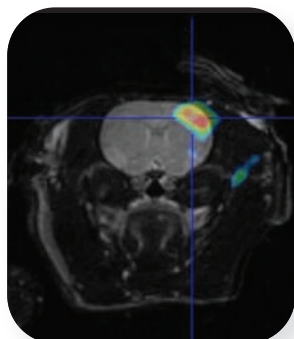


What we do best: helping researchers do their best

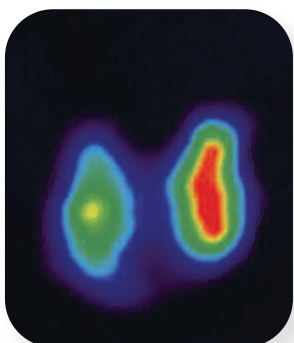
At Carestream, digital imaging is our core competence; it's part of our DNA. We have been providing advanced digital molecular imaging systems to preclinical researchers around the world for a very long time. With decades of expertise and hands on experience in preclinical small animal imaging, we understand your needs and the challenges you face. Our PhD application support scientists and our highly responsive service organization are ready to answer questions and help solve problems whenever you need them.

Whether you need to expand your current research or create a new imaging facility, we are there for you — now and for years to come. Because at Carestream, preclinical imaging isn't just an afterthought. It's our life's work.

Our life's work also includes bringing new imaging technologies to light, wherever they exist in the world. So we look for other companies who share our commitment, and partner with them to bring innovative products to our customers. We partnered with Oncovision to bring you Albira, which incorporates the same award-winning technology used in Sentinella, a widely-implemented, clinically validated radio-guided surgery system.



¹⁸F-FMISO image in rat brain *



¹²⁵I image of mouse thyroids



Fused PET/CT Image
of mouse rib cage & heart ‡

This is what makes Albira great:

- **Very high resolution and superior image quality**
 - ▼ Revolutionary single crystal PET detection technology
 - ▼ Major advance in DOI performance, overcomes parallax error
 - ▼ Excellent sensitivity
- **Rapid multimodal acquisition and reconstruction**
 - ▼ Proprietary electronics and advanced reconstruction algorithms
 - ▼ Optimized protocols, ready to use and adaptable
- **Powerful quantification and dynamic analysis options**
 - ▼ Highly accurate location and volume of interest measurement
 - ▼ Precise assessment of standard uptake value
 - ▼ Robust multi-parameter modeling of radiotracer kinetics
- **Automatic image fusion with full MRI compatibility**
 - ▼ Automatic multimodal image fusion, several functional views per image
 - ▼ Precision motion control, dedicated software and single-ring motion for superior image fusion
 - ▼ Proven MRI compatibility (animal bed and software)
- **User friendly, state-of-the-art software suite**
 - ▼ Modules for acquisition, reconstruction, data management & quality control
 - ▼ Designed specifically for preclinical imaging research
- **Complete integrated protocols that are practical, flexible and easy to customize**
 - ▼ Powerful workflow, fully adaptable to your research needs
 - ▼ One-click multimodal acquisitions
- **World-class service, training and technical support**
 - ▼ Choice of extended service packages to maximize instrument performance
 - ▼ Expert training for users at all skill levels
- **Compact, modular and upgradeable**
 - ▼ Flexible combination of PET, SPECT & CT to meet your current requirements
 - ▼ Fits in your lab - compact footprint never changes
- **True turnkey advanced research solution**
 - ▼ All-inclusive system includes everything you need to begin imaging
 - ▼ Complete installation, calibration and initial training included

* Courtesy of Prof. M.A.Pozo
Instituto Pluridisciplinar
Universidad Complutense de Madrid.

‡ Courtesy of Dr. W. Matthew Leevy
University of Notre Dame

Albira takes your research out of the box and into the fast lane.

Albira is a powerful, flexible and fully integrated preclinical research platform that sets a new standard for image quality, speed, quantification, and resolution. Albira's elegant architecture translates to exceptional performance. All components are precisely optimized and perfectly synchronized so that nothing gets in the way of your research. Albira comes 100% complete with everything you need to begin imaging — all you need to add is a research subject and radiotracer. And it all fits in less than half the space of other, less advanced, PET/SPECT/CT systems.

Here's how it works:

A breakthrough in PET Imaging

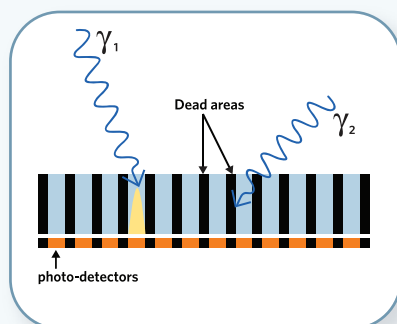
The Albira PET system powers your research with best-in-class spatial resolution and highly sensitive detection. Albira's revolutionary detector technology corrects for parallax error to produce exceptionally accurate, highly resolved PET images. Need to enlarge your imaging area? A convenient upgrade path makes it easy to add detector rings to expand the field of view and increase sensitivity.

The difference is crystal clear.

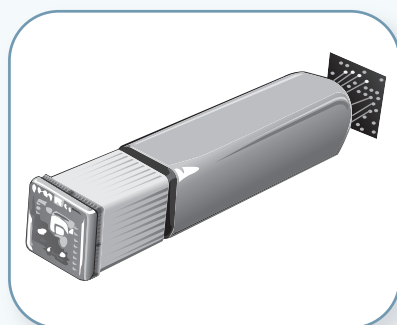
Unlike conventional systems, Albira PET technology uses single, continuous crystals without dead zones. The Albira system uses these crystals, along with their associated position sensitive photo-multiplier tubes (PSPMT) and PET electronics, to measure the depth of interaction by the shape of the detected light.

This corrects for parallax error — without sacrificing sensitivity. By contrast, the pixelated crystal detectors used in other PET systems must be packed more densely in larger detector areas in order to reduce parallax error. Only Albira's revolutionary PET technology breaks free from this limitation.

Conventional Technology

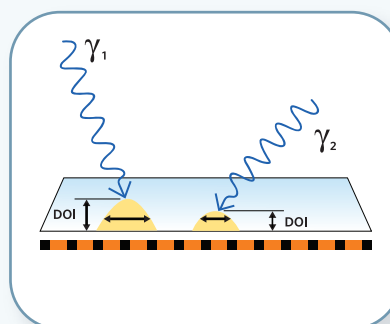


Pixelated crystal technology with dead zones.

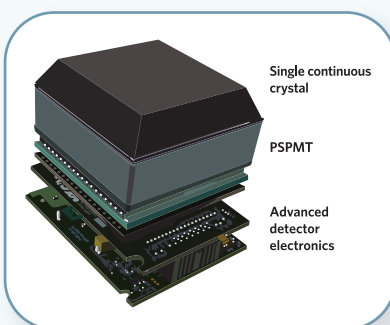


Standard PET detector technology

Albira Technology



Simultaneous detection of position and DOI measurement. No dead zones.



Albira's exclusive patented PET detector

Sensitive, reliable and fast SPECT imaging

Albira SPECT technology gives you the ability to image a wide variety of readily available radiotracers. The single-crystal design, which has been well validated in award-winning clinical gamma cameras, provides excellent resolution along with highly sensitive detection of SPECT probes and their cognate targets.

You can choose between a single pinhole collimator for simple preview acquisitions and tomographic reconstructions, or a multi-pinhole collimator for enhanced sensitivity and the shortest acquisition times. Optimized reconstruction algorithms, coupled with a dedicated reconstruction computer, allow for exceptionally rapid SPECT reconstructions.

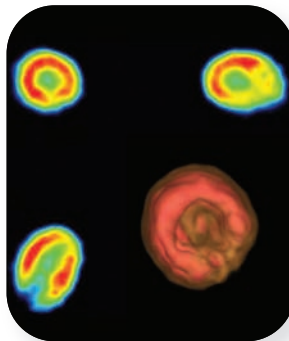
Highly quantitative anatomical CT imaging

The Albira CT system delivers accurate and quantitative information about bone and tissue structures in both partial and whole-body scans. This CT system can be used to provide a precise anatomical context for functional images and to study bone and soft tissue phenotypes. Multimodal Albira systems then automatically co-register this anatomical information to PET and SPECT images with outstanding speed and precision.

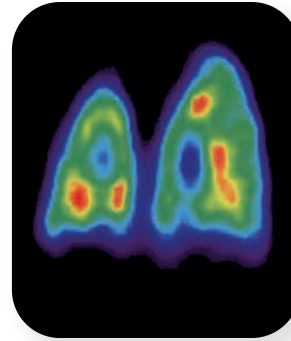
To ensure maximum versatility, Albira CT is pre-optimized for a wide range of acquisition modes, including high-resolution imaging or rapid low-dose imaging.

Use Albira for precisely quantified *in vivo* studies:

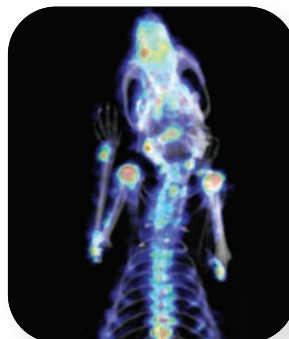
- Pharmacokinetics
- Pharmacodynamics
- ADME
- Protein Expression
- Metabolic Studies
- Gene Expression
- Toxicology
- Perfusion Studies
- Cell Tracking
- Receptor Binding
- ...and much more!



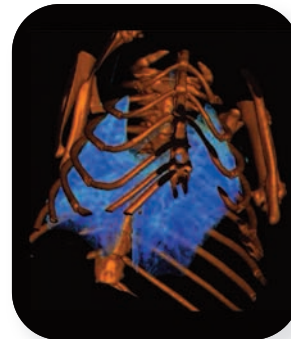
3D view of a rat heart, courtesy of Prof. J. Viña, University of Valencia



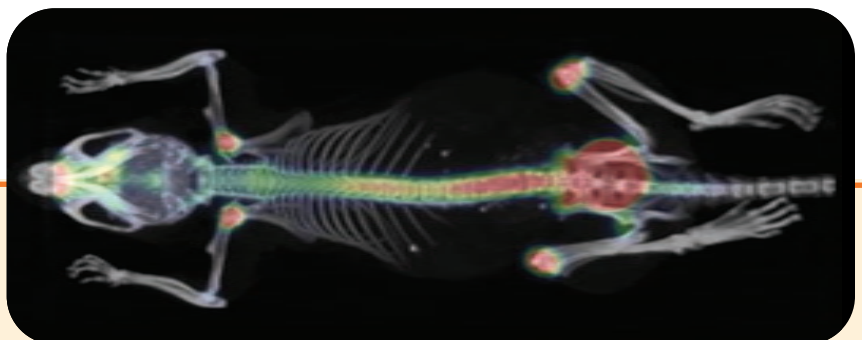
Lung perfusion in a mouse with ^{123}I MAA



Rat head $^{99\text{m}}\text{Tc}$ -MDP imaging †



Detailed CT image highlighting both bone and soft tissue structures



^{18}F -NaF Bone Scan PET/CT Fusion Image †

† Courtesy of Dr. W. Matthew Leevy
University of Notre Dame

Take a look under the hood.

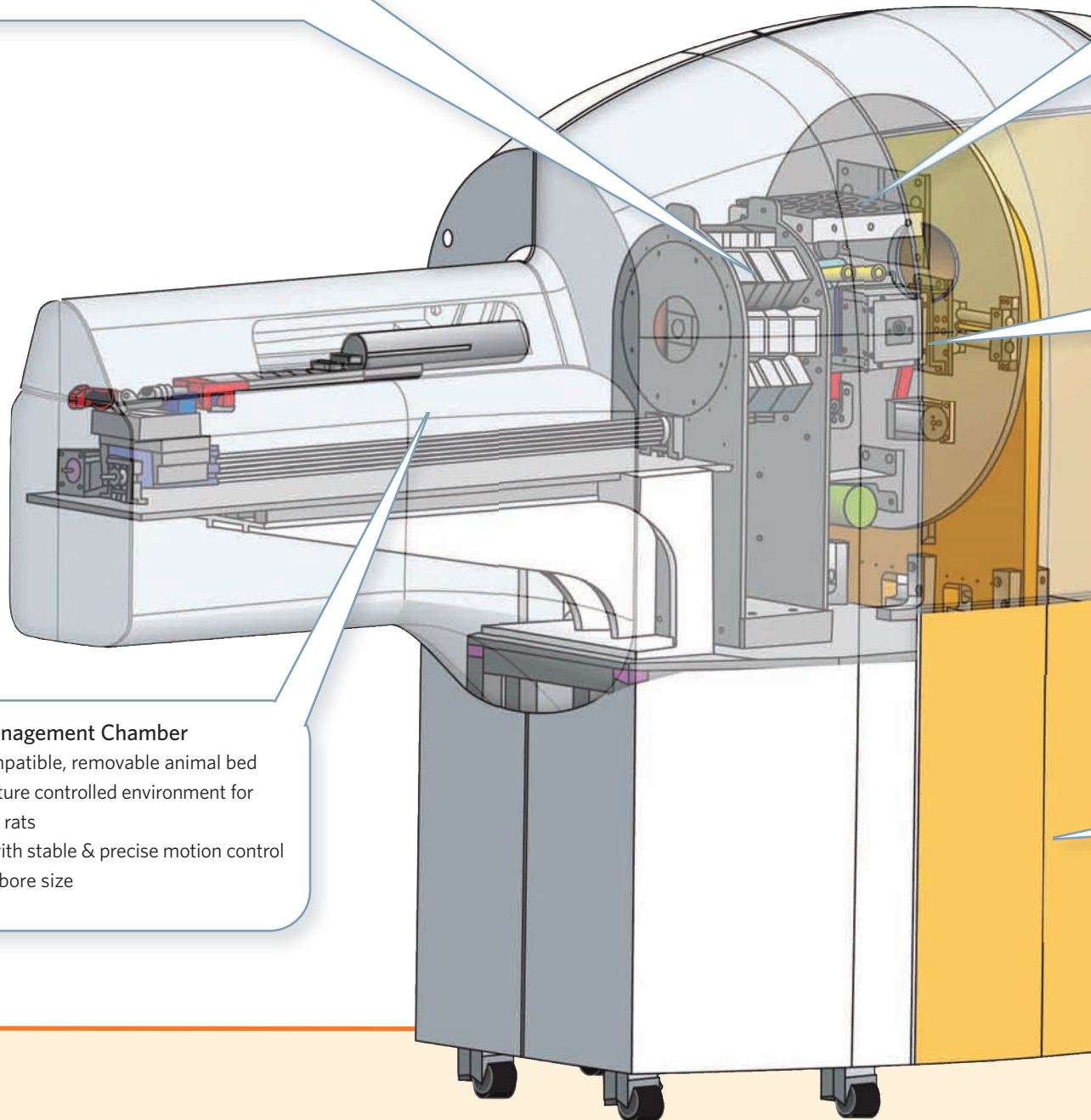
Albira's beauty is more than skin deep! Look beneath its streamlined, shielded shell, and the true genius of Albira's modular construction and flexibility is immediately clear. It has everything you need — from exceptional performance to multiple upgrade paths to smooth, convenient workflow—all neatly packaged in a 2.2 m x 0.9 m x 1.6 m footprint. It will fit in virtually any lab.

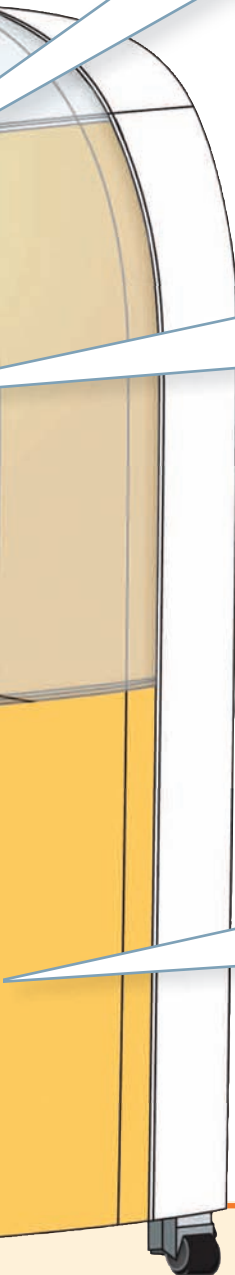
Exclusive Albira PET system

- Exclusive, proprietary single crystals, associated detectors and dedicated PET electronics
- Leading, high-resolution 3-D images with novel DOI codification
- High sensitivity detectors, 8 detectors per ring, 1, 2, or 3 rings per system

Animal Management Chamber

- MRI-compatible, removable animal bed
- Temperature controlled environment for mice and rats
- Gantry with stable & precise motion control
- 105 mm bore size





Quantitative, intuitive CT

- Returns fully calibrated data quantified in Hounsfield units
- Automatic fusion with PET and SPECT images including attenuation correction
- Two-dimensional digital X-ray detector
- Rapid acquisition and reconstruction

High Resolution, Sensitive SPECT

- 2 rotating gamma cameras built with Albira's proprietary single crystal detectors and PSPMTs
- Variable FOV
- Single and multi-pinhole configurations

Electronics Core

- Embedded acquisition computer
- Easy access for maintenance
- Advanced air cooling system

Small Footprint

- Compact size (2.2 m x 0.9 m) fits in your laboratory
- Upgradeable to bi-modal and tri-modal system within existing footprint

Albira's multiple configurations and upgrade paths protect your investment.

Albira can be purchased in many configurations to suit your needs, and you can easily upgrade as your research needs change over time. Your capabilities expand, but the size of your system does not.

Seven systems available:

- Standalone PET
- Standalone SPECT
- Standalone CT
- Bi-modal PET/CT
- Bi-modal PET/SPECT
- Bi-modal SPECT/CT
- Tri-modal PET/SPECT/CT

Upgrade:

- Standalone to bi-modal or tri-modal
- Bi-modal to tri-modal

Customize:

- Add PET detector rings for larger FOV and increased sensitivity
- Choose the gamma camera for your SPECT system based on your sensitivity and resolution requirements

Organize your workflow with powerful software - optimized for small animal research.

Albira comes complete with three powerful, easy to use software solutions for every phase of your preclinical workflow.

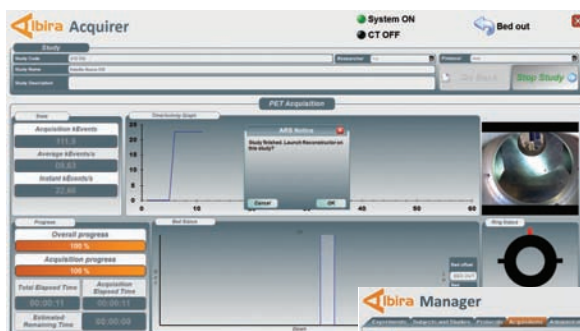
1. Albira Software Suite

The Albira Software Suite consists of four dedicated modules: Acquirer, for data acquisition; Reconstructor, for 3D image reconstruction; Manager, for complete system management; and Supervisor, for quality control. Protect your research with the comprehensive suite of administrative tools that allow you to assign user privileges to ensure data integrity.

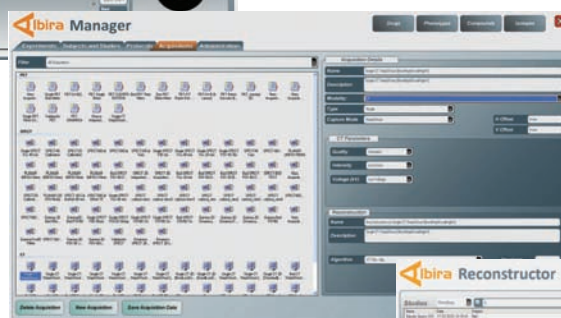
The interface is designed for simplicity and ease of use: a single screen provides all the visual information you need. Integrated protocols that are practical, flexible and easy to customize are included to maximize your productivity.

Robust capabilities include single-click multimodal acquisitions and rapid reconstructions in all modalities, including batch reconstruction options. A fully integrated database contains information on researchers, subjects, protocols and more.

A dedicated acquisition computer and a dedicated dual quad core reconstruction computer are both included with the system, as well as a dedicated data storage computer that starts at three TB of storage and is scalable as your storage needs change.



Acquirer Module



Manager Module

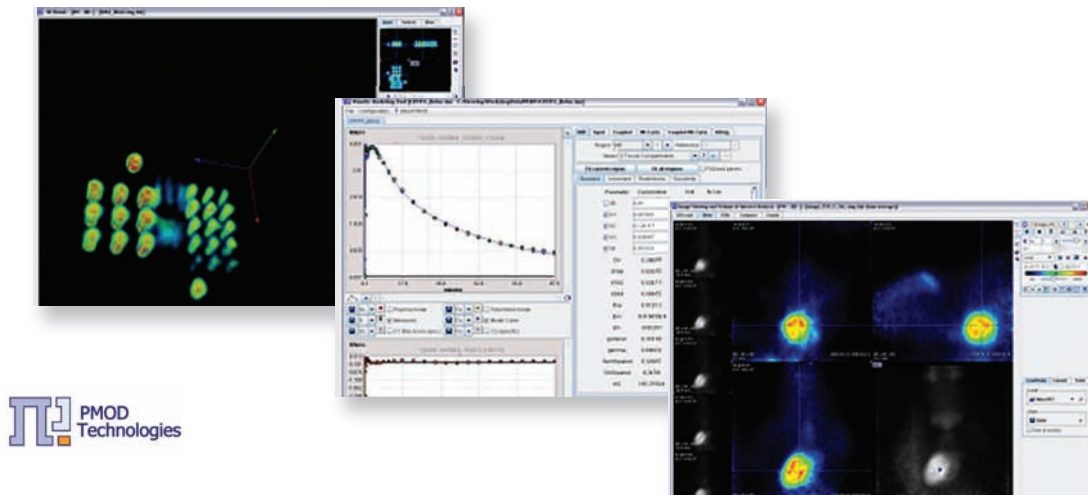


Reconstructor Module

2. PMOD Data Analysis Software

PMOD software, a comprehensive solution for data processing tasks in molecular imaging, is the standard kinetic modeling platform for scientists using Positron Emission Tomography in preclinical research. The registration and analysis capabilities of the PMOD image fusion tool make it an ideal solution for multimodal imaging. PMOD consists of a set of user-friendly and powerful tools for modeling, image rendering and analysis. PMOD capabilities include:

- 3D image matching and image fusion
- Data quantification through simple volume of interest (VOI) analysis
- Multi-parameter kinetic modeling
- Built in simulation studies and Monte-Carlo parameter estimations
- Movie rendering options



3. VolView - for high quality image rendering

VolView is a powerful image rendering tool that was created specifically for use with scientific imaging data. We provide VolView so that you can create high impact renderings of your 3D images for publication, presentations, and more.



Worldwide service, training and technical support from Carestream Health

At Carestream, we want your research programs to succeed, so we are here to support you with a comprehensive suite of service, training and technical support programs that are second to none.

Comprehensive support and protection for your investment

We help you protect your investment by offering:

- A comprehensive warranty, backed by an expert service team, so you are covered from day one
- A choice of service packages from basic to premium and preventive maintenance
- A range of technical support options including phone support and remote access support
- Application support by our team of PhD scientists
- Problem solving assistance by our imaging experts and highly responsive world-wide support team

Training programs for users at all levels

We help you achieve more by offering training programs that are custom designed to meet your specific imaging and application needs. Select from cost-effective options for users at all levels: from basic introductory skills to in-depth techniques for advanced users. From one-on-one instruction to a full classroom. On-site or on-line - it's your choice.



Albira Components (Tri-modal system)

Albira Structure, Shell, and Animal Management

- Shielded shell for X-ray imaging
- Mouse and rat animal transport system compatible with MRI systems and gas anesthesia systems
- Restricted access PET/SPECT/CT zone with alarms

On Board Electronics

- PET boards for coincidence counting and DOI correction
- Dedicated acquisition computer

PET Components

- Exclusive, proprietary single-crystal detectors and associated electronics
- 8 detectors per ring; 1, 2, or 3 rings per system

SPECT Components

- 2 Exclusive, proprietary single-crystal gamma camera detectors, S102 or S108 configuration
- Rail mounted for multiple fields of view
- Multi-pinhole (S102=5, S108=9) & single pinhole collimators

CT Components

- X-ray source 35 μm (nominal spot size), 50 kVp max, 1 mA max current
- 2D digital X-ray detector 120 x 120 mm, 2400 x 2400 pixels

Image Reconstruction and Image Database Computers

- Reconstruction computer dual Quad core computer dedicated to image reconstruction with 4 GB of RAM
- Storage system - 3 TB standard scalable as your storage needs change

Software included

- Albira Suite
 - ▼ Manager - system configuration and administration
 - ▼ Acquirer - data acquisition
 - ▼ Reconstructor - 3D image reconstruction
 - ▼ Supervisor - system quality control and calibration
- PMOD
 - ▼ Surface-rendering based upon threshold segmentation
 - ▼ VOI analysis
 - ▼ Image co-registration
 - ▼ Kinetic modeling
- VolView
 - ▼ Exceptional 3D image rendering

Albira Specifications

PET System and Capabilities	
Detector Type	LYSO single crystal, PSPMT and PET electronics
Number of Detectors	8 per ring up to 3 rings
Depth of Interaction Correction	State-of-the-art DOI correction based upon the distribution of the light detected in the detector
Sensitivity Greater Than	3 ring: 9% 2 ring: 5% 1 ring: 3%
Resolution Center FOV (mm)	3 ring: < 1.1 2 ring: < 1.2 1 ring: < 1.3
FOV (transaxial mm)	80
FOV (axial mm)	3 ring: 148 2 ring: 94 1 ring: 40
SPECT System and Capabilities	
Detector Type	CsI (Na) single crystal, PSPMT, and SPECT electronics, 2 detectors per instrument
Maximum Sensitivity (cps/MBq)	S108: 1000 S102: 650
Energy Range (keV)	S108: 30 - 400 S102: 40 - 250
Energy Discrimination	14% at 140 keV
Collimators Provided	S108: 1 pinhole, 9 pinhole S102: 1 pinhole, 5 pinhole
FOV (mm)	S108: 30 - 140 S102: 20 - 80
Reconstruction Times	<= 5 min
Acquisition Times (60 projections)	<= 30 min
Minimum Resolution (mm)	S108: <= 0.6 S102: <= 0.8
CT System and Capabilities	
Minimum Voxel Size (µm)	<35 µm
X-ray Focal Spot Size (Nominal µm)	35
Energy Range (kVp)	10-50
Max Current (mA)	1
FOV (transaxial x axial mm)	70 x 70
Detector Pixels	2400 x 2400
Physical Specifications	
Footprint (W x D x H m)	2.2 x 0.9 x 1.6
Recommended Area (W x D x H m)	3 x 2.5 x 2
Bore Size	105 mm
Animal Monitoring	Internal video camera allows users to monitor the status of their mouse from the workstation
Compatible with Most Commercial Gas Anesthesia	Yes
Computer Supplied	Acquisition workstation, reconstruction workstation with dual quad core processors, and storage unit with 3 TB of disk space, scalable options available
Electrical Requirements	110 VAC 15 A 220 VAC 8 A

Rave reviews from Albira users:

"Our department is centered upon brain studies, and Albira is one of our most advanced and important research tools. The high sensitivity of the Albira PET system and the exceptional quality of the resulting images has enabled us to perform studies that would not have been possible without Albira technology."

Professor Mignel A. Pozo, PhD. — Universidad Complutense de Madrid

"Albira is virtually "plug and play." The experts at Carestream have done an excellent job of distilling this complex technology down to its basic elements. Image acquisition is literally "push button," with PMOD and VolView providing rigorous but straightforward analytical and rendering tools. We were able to collect very nice PET and SPECT images just one day after installation."

Professor W. Matthew Leevy, PhD — University of Notre Dame

PET/CT ¹⁸F-FDG image of colon cancer tumor model, and CT image of mouse knee (on front cover) courtesy of Dr. W. Matthew Leevy, University of Notre Dame

Learn more about Albira.

For more information, to request pricing or to place an order, call 1-877-747-4357, express code 7. Outside the U.S., please call +1-203-786-5658.

Or visit us online at

 mi.carestream.com



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