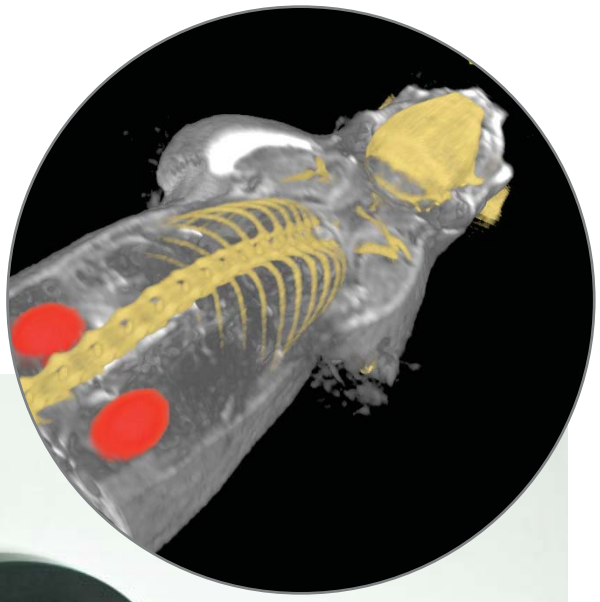
Preclinical Imaging Instruments

Models to fit the Discovery MR901 system
Triumph® II PET/SPECT/CT System*
eXplore CT 120 MicroCT
eXplore Locus MicroCT
eXplore speCZT
LabPET® Solo*



"A patented suite of technologies for true high throughput preclinical imaging in a multi-modality laboratory environment"

"An innovative approach to the loading, handling and containment of animal models in the preclinical imaging environment"

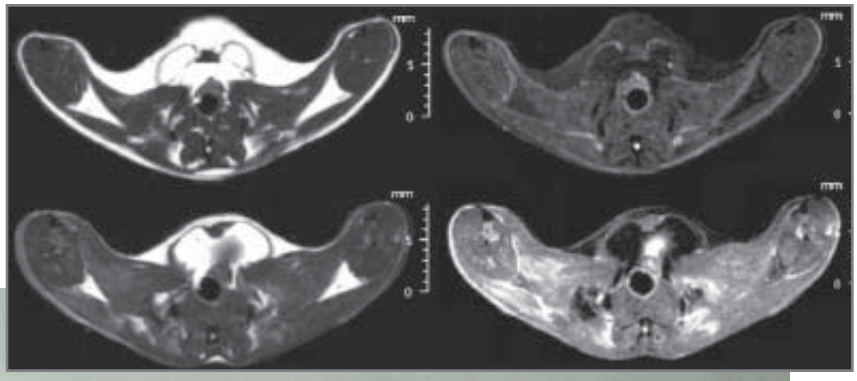
Life Sciences Research Tools, "Designed by Scientists for Scientists"

ASI® INSTRUMENTS

Publication #1004

Positioning Assembly System (PAS)

Foundational device for the MRI technology, the PAS (U.S. Pat #7,414,403) semi-permanently mounts; either directly to the gradient system, magnet, or bore of the MRI system (depending on the model selected). This is the reference fixture for which the AMS interfaces with, the various insertable type RF coils are positioned to and the ISO center of the MRI is gaged from. The system was designed for anatomy specific research in high throughput imaging environments. This technology enables the researcher unparalleled speed and accuracy of animal specific anatomy placement within the "sweet spot" of the magnet. These features, in conjunction with the advance AMS design features, reduces the animal loading complexities, including physiological monitoring hook-ups, to simple, route steps that increase overall scanner efficiency and quality of research data output. The image illustrates the highly repeatable body placement of the specimen, allowing anatomy specific image to image comparative analysis unobtainable by other means.



RF Probes are referenced to innermost keyed plate for a highly repeatable, quick and exacting placement of various sized coils.

The AMS interfaces to the MRI system with the patented "vee groove" rail features. These features, mechanically orients with high precision, the AMS in 2 degrees of freedom (DOF). The device is positioned along the sliding contact points (rails), to engage the anatomy specific stop with the outermost reference plate of the PAS. This gives the researcher the all important 3rd DOF, "Z depth location". The simple steps required to position the specimen in the MRI once it is loaded on the AHS are to; engage the AHS with the MRI specific PRA (AMS) and insert the specimen via the AMS until all 3 DOF are engaged and referenced.

Animal Management System for MRI Applications (AMS)

The innovative device is comprised of a two component system, (U.S. Pat. #7,865,226) the first being a MRI specific POSITIONING RECEIVER ASSEMBLY (PRA) which is designed to engage the PAS via a set of opposing vee grooved rails. These rails mate to a set of opposing rails on the PAS. (U.S. Pat. #7,414,403) The PRA is pre-routed for all the required support features to maintain the animal, under anesthesia in a controlled imaging environment. Furthermore, the PRA is pre-wire to accept two surface coils, via (2) 50Ω connectors. This allows for the placement, within the animal chamber area of the AHS, two surface coil systems. The second component is the ANIMAL HANDLING SYSTEM (AHS) which holds the animal in a predetermined body position and has a complete pre-configured physiological support bed. Repeatable body and limb placement introduces the scientific community to a new tool for between laboratory collaborative imaging efforts.

Innovative coupling system (U.S. Pat #7,534,067) allows the animal bed to interface to the machine and the support instrumentation. The system provides a workflow technology for the integration of single/dual modalities scanners to create mechanically registered multi-modality images. All components are fabricated from none magnetic materials to exacting quality standards. The systems have been used in magnet fields strengths as high as 9.2T. Each system is shipped with a BENCH GAS CONNECTOR (BGC) which allows for the loading and unloading of the animal to be accomplish off the scanner. All connections interface thru the docking connector, for quick animal interface. This gives the end user true unparalleled imaging throughput. With two AHS units in use, one animal can be staging at the bench while the other animal is being processed on the scanner.

Animal Management System for Triumph (AMS)

Novel device is comprised of a two component system, (U.S. Pat. #7,865,226) the first being a machine specific POSITIONING RECEIVER ASSEMBLY (PRA) which is semi permanently mounted to the scanner and is pre-routed with all support features for the animal. The second component is the ANIMAL HANDLING SYSTEM (AHS) which holds the animal in a predetermined body position, has a complete, pre configured physiological support bed and allows the animal bed to interface to the machine and the support instrumentation via the novel coupling system.
The system provides a workflow technology for the integration of single/dual modality scanners to create mechanically registered multi-modality images. All components are fabricated from none magnetic materials. The modalities supported are CT, SPECT, PET, and MRI. Each system is shipped with a BENCH GAS CONNECTOR (BGC) which allows for the loading and unloading of the animal to be accomplish off the scanner. All connections interface thru the docking connector, for quick animal interface. This give the end user true unparalleled imaging throughput. With two AHS units being used, one animal can be staging at the bench while the other animal is being processed on the scanner.

Innovative coupling system (U.S. Pat #7,534,067) for the quick and precision placement of the AHS onto the scanner. All panel features are routed through the receiver coupling and are terminated with a custom docking connector system. A cap is provide for sealing, protection, and transportation of device.
The workflow concepts set forth by the instrumentation design mandates that each scanner to be used has a manufacture specific PRA with a receiving coupling system oriented for the quick engagement of the AHS with the center line of the scanner bore. ASI Instruments manufactures variety of PRA for various modalities.

Pages 5 through 7 show the various versions of the positioning receiver assembly (PRA) available that can be combined with the various styles of our animal handling system (AHS) to create a machine specific AMS for the complete product line of GE scanners

Positioning Receiver Assembly, Triumph (PRA-8000)

This is a scanner specific interface system which is approve by the scanner manufacture to quickly and semi permanently mount to the Triumph type multi-modality micro CT, SPECT and PET and the GE stand alone micro PET scanners. The patent system allows the AHS to quickly and repeatable interface to the scanner via the quick lock coupling system. The system has animal repeatable body placement of better than 50 microns (Holdsworth, etal, SPIE 2011). External connections allow for pre-routing all connections associated with the support instruments. These connection are internally plumbed to the female docking connector for the quick interface of all the support features when the AHS is engage to the PRA. This device also has a video camera attached to facilitate visual observation of the specimen.

The connections routed out the back portion of the PRA are as follows:

(1) 3.0mm standard, 3 lead stereo jack, color coded red, white and black for ECG leads
(1) 3.0mm standard, 3 lead stereo jack, color coded blue for temperature probe, 2 leads
(1) 3.0mm standard, 3 lead stereo jack, color coded green for auxiliary connection of 2 leads
(2) fiber-optic connector
(2) fluidic connectors with shut - off for re-circulating warm water heating or re-circulating warm air for heating.
(1) luer type connection, color coded blue to connect the respiratory pillow
(1) luer type connection, color coded green to connect the anesthesia gas in
(1) tube - tube type connection, to connect the EVAC gas circuit.

Positioning Assembly System, CT-120 (PRA-3000-324)

This is a scanner specific interface system which is approve by the scanner manufacture to quickly and semi permanently mount to the CT-120 type micro CT scanners. The mounting of the PRA is accomplished by a front located integrated male “camera mount” bracket. The patent system allows the AHS to quickly and repeatable interface to the scanner via the quick lock coupling system. The system has animal repeatable body placement of better than 50 microns (Holdsworth, etal, SPIE 2011). External connections allow for pre-routing all connections associated with the support instruments. These connection are internally plumbed to the female docking connector for the quick interface of all the support features when the AHS is engage to the PRA. This specific PRA has a 324mm carbon fiber extension off the main housing. This extension is engineered to provide proper access to the FOV centerlines dictated by the manufactures design.

The connections routed to the panels from the coupling are as follows:

(3) 1.5mm standard, non-touch type, medical grade leads, color coded red, white and black for ECG leads
(2) 1.5mm standard, sockets, color coded blue for temperature probe, 2 leads
(1) 1.5mm standard, sockets, color coded green for auxiliary connection, 2 leads
(2) fiber-optic connector
(2) fluidic connectors with shut - off for re-circulating warm water heating or re-circulating warm air for heating.
(1) luer type connection, color coded blue to connect the respiratory pillow
(2) fluidic connectors for anesthesia gas in, EVAC gas circuit out.

Positioning Assembly System, speCZT (PRA-3000-725)

This is a scanner specific interface system which is approve by the scanner manufacture to quickly and semi permanently mount to the SpectZCT type multi-modality micro CT, SPECT scanners. The mounting of the PRA is accomplished by a front locked integrated male “camera mount” bracket. The patent system allows the AHS to quickly and repeatable interface to the scanner via the quick lock coupling system. The system has animal repeatable body placement of better than 50 microns (Holdsworth, etal, SPIE 2011). External connections allow for pre-routing all connections associated with the support instruments. These connection are internally plumbed to the female docking connector for the quick interface of all the support features when the AHS is engage to the PRA. This specific PRA has a 725mm carbon fiber extension off the main housing. This extension is engineered to provide proper access to the multiple FOV centerlines dictated by the manufactures design.

The connections routed to the panels from the coupling are as follows:

(3) 1.5mm standard, non-touch type, medical grade leads, color coded red, white and black for ECG leads
(2) 1.5mm standard, sockets, color coded blue for temperature probe, 2 leads
(1) 1.5mm standard, sockets, color coded green for auxiliary connection, 2 leads
(2) fiber-optic connector
(2) fluidic connectors with shut - off for re-circulating warm water heating or re-circulating warm air for heating.
(1) luer type connection, color coded blue to connect the respiratory pillow
(2) fluidic connectors for anesthesia gas in, EVAC gas circuit out.

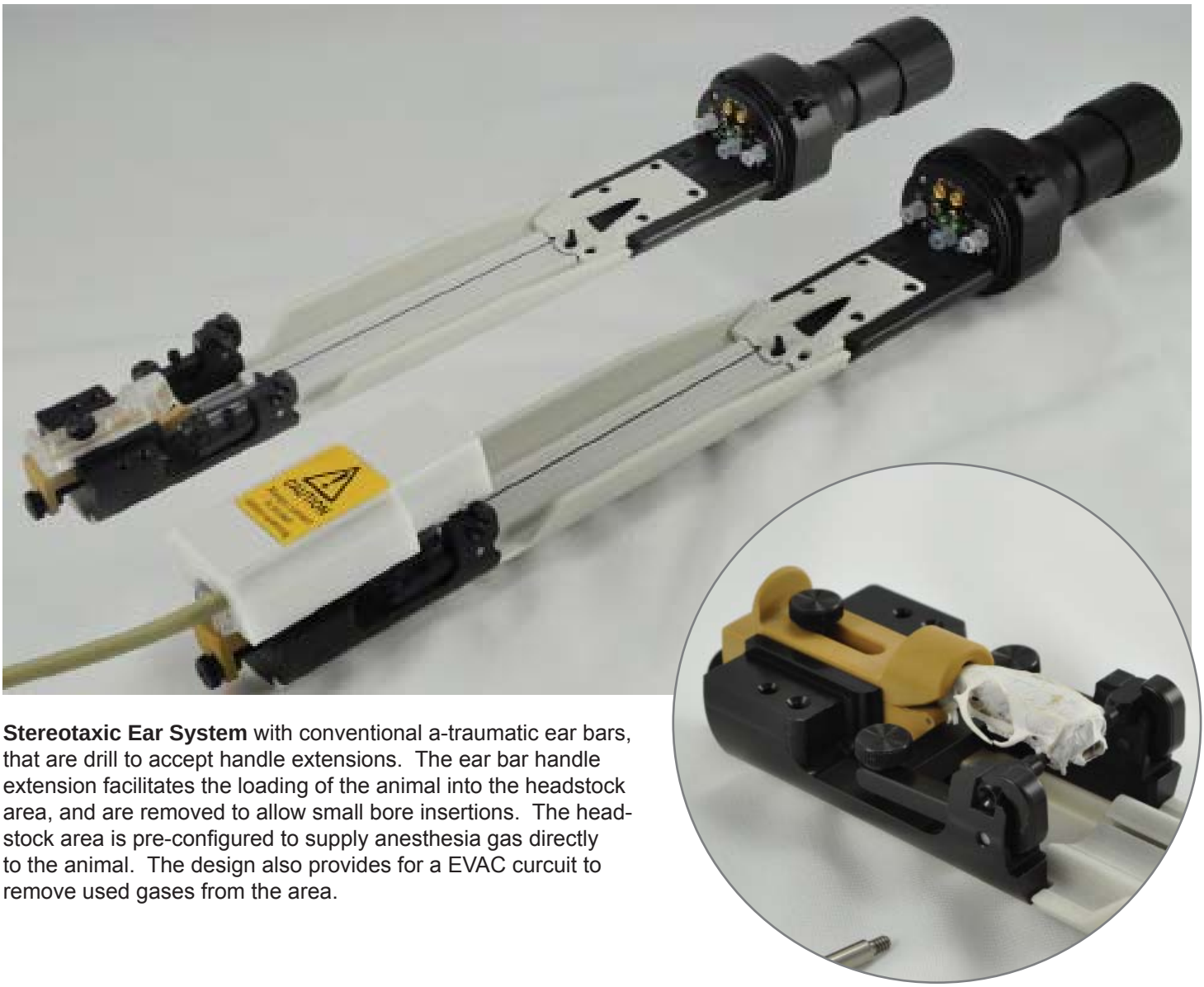
Animal Handling System for Mouse (AHS-2750-M1)

Contoured animal bed (patent pending) for repeatable animal body and limb placement. The bed design, allows for quick, precision, animal loading, and physiological support interface. (usually within 2 minutes). The mouse bed accommodates an animal body weight range of 15 g – 50 g. The pre-configured physiological monitoring, anesthesia gas (In, Evac) thermal management , ECG leads, and respiration exit through the union coupling and automatically interface when the device is plugged into any PRA. The headstock position of the bed has and adjustable incisor bar and nose cone system. Additionally, the bed can be optionally configured with standard stereotaxic ear bar mounting techniques. The AHS can be use with or without the containment vessel. When used with the Bench Gas Connector the loading of the animal can be accomplished away from the scanner, allowing for higher throughput rates on the scanner. It also facilitates BSL-2 protocols for loading the a specimen within the controlled environment of a hood system.

Containment vessel, facilitates imaging in BL-2, BL-3 environments. The unit doubles as a transportation device for moving the animal from scanner to scanner or bench to scanner. All that is required is to de-couple the AHS from the first scanner, walk over to the second scanner, and re-engage the AHS in the coupling of the PRA mounted on the second scanner. The AHS is submersible with the protective end cap on for decontamination protocols that involves dunking the system in and out of a laboratory spaces. There is an optional containment vessel for “injecting into the containment environment” (patent pending). Disposable eal-able to the containment vessel, catheters (patent pending) are also available of purchase.

Animal Handling System for Rat (AHS-2750-R1)

Contoured animal bed (patent pending) for repeatable animal body and limb placement. The bed design, allows for quick, precision, animal loading, and physiological support interface. (usually within 2 minutes). The rat bed accommodates a broad range of animal body weights. The pre-configured physiological monitoring, anesthesia gas (In, EVAC) thermal management , ECG leads, and respiration exit through the union coupling and automatically interface when the device is plugged into any PRA. The headstock area of the bed has an adjustable incisor bar nose cone system, and is configured with conventional a-traumatic stereotaxic ear bars. The head stock area is completely removable from the bed to aid the researcher with additional accept for the mount of the animal into the headstock. The head stock area is pre-drilled to accept the rapid style multi-channel head coil system. The AHS can be use with or without the containment vessel. When used with the Bench Gas Connector the loading of the animal can be accomplished away from the scanner, allowing for higher throughput rates on the scanner. It also facilitates BSL-2 protocols for loading the a specimen within the controlled environment of a hood system.



Stereotaxic Ear System with conventional a-traumatic ear bars, that are drill to accept handle extensions. The ear bar handle extension facilitates the loading of the animal into the headstock area, and are removed to allow small bore insertions. The head-stock area is pre-configured to supply anesthesia gas directly to the animal. The design also provides for a EVAC curcuit to remove used gases from the area.

Ordering Information

Model Numbers and Pricing:

PRA-4000
Positioning Receiver Assembly for MRI applications
70 mm coupling system, unit is designed to interface to the PAS product line of MRI machine specific assemblies.
Price: $6,500.00

PAS-3000
Positioning Assembly System for Agilent Discovery MR901 system,
70 mm coupling system is designed to mount to the front of the Resonance Research, Inc., 210-7T gradient system.
Price: $6,300.00

PRA-8000
Positioning Receiver Assembly for GE Triumph II and LabPET Solo scanners
70 mm coupling system, unit ships with cables to connects to all physiological monitoring and support.
Price: $6,900.00

PRA-3000-324
Positioning Receiver Assembly for GE eXplore CT-120 MicroCT scanners
70 mm coupling system, unit ships with cables to connects to all physiological monitoring and support.
Price: $7,350.00

PRA-3000-725
Positioning Receiver Assembly for GE eXplore speCZT scanners
70 mm coupling system, unit ships with cables to connects to all physiological monitoring and support.
Price: $7,640.00

AHS-2750-M1
Animal Handling System, 70mm coupling system, mouse bed # 1 with containment system,
unit ships with filters for BSL-2 containment protocols, replacement o-ring kit, bench top gas connector.
Price: $5,560.00

AHS-2750-R1
Animal Handling System, 70mm coupling system, rat bed # 1 with containment system,
unit ships with filters for BSL-2 containment protocols, replacement o-ring kit, bench top gas connector.
Price: $5,560.00

Typical Orders:

Agilent/GE Discovery MR901 system:
(1) PAS-3000, Positioning Assembly System
(1) PRA-4000, Positioning Receiver Assembly
(1) AHS-2750-M1, Animal Handling System

GE Triumph II system and LabPET Solo:
(1) PRA-8000, Positioning Receiver Assembly
(1) AHS-2750-M1, Animal Handling System

GE eXplore CT-120 MicroCT system:
(1) PRA-3000-324, Positioning Receiver Assembly
(1) AHS-2750-M1, Animal Handling System

GE eXplore speCZT system:
(1) PRA-3000-725, Positioning Receiver Assembly
(1) AHS-2750-M1, Animal Handling System

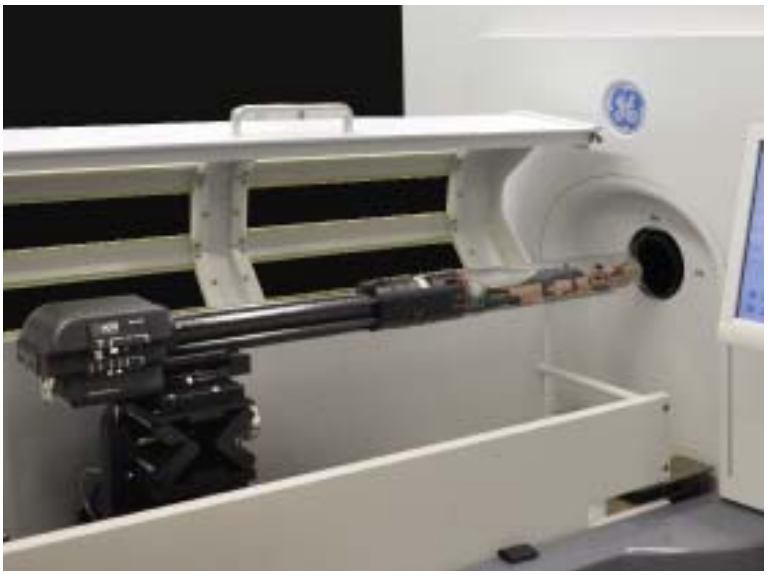
Note: multiple Animal Handling Systems (AHS) maybe preferred

Contact Information

Contact Information:

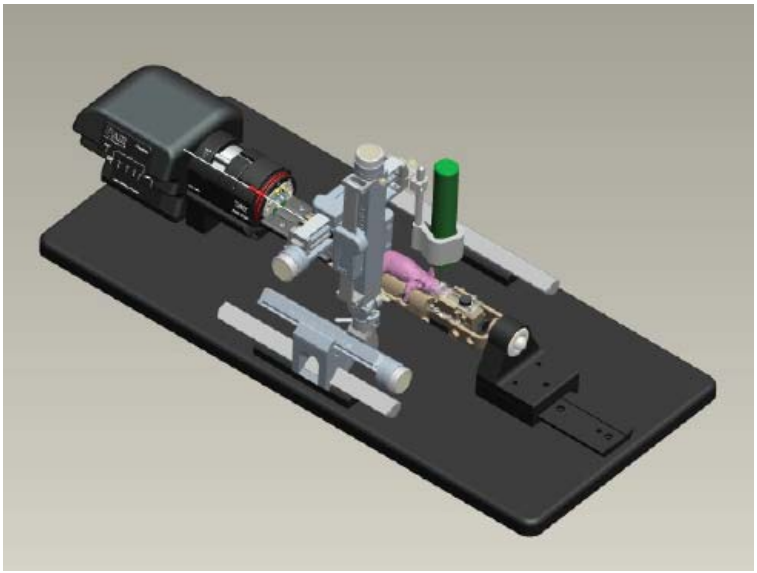
ASI Instruments, Inc.
12900 E. 10 Mile Road
Warren, MI 48089 USA
Ph: (586) 756-1222
Fax: (586) 756-9737
e-mail: sales@asi-instruments.com

Current Models for the GE eXplore CT-120 MicroCT, and the eXplore specCZT are available



Future Models, Technologies, for high throughput staging workflows of specimens in the preclinical imaging

Future Models, Technologies, for Image Guided Surgery (IGS) in the preclinical imaging environment



Current Models for other modalities are also available

"The AMS design was partially funded by a Phase I, STTR grant, #R41-NS050141-01, NIH, NINDS"

Life Sciences Research Tools, "Designed by Scientists for Scientists"

* a registered trademark of Gamma Medica - Ideas, Inc., Northridge, CA 91324, USA