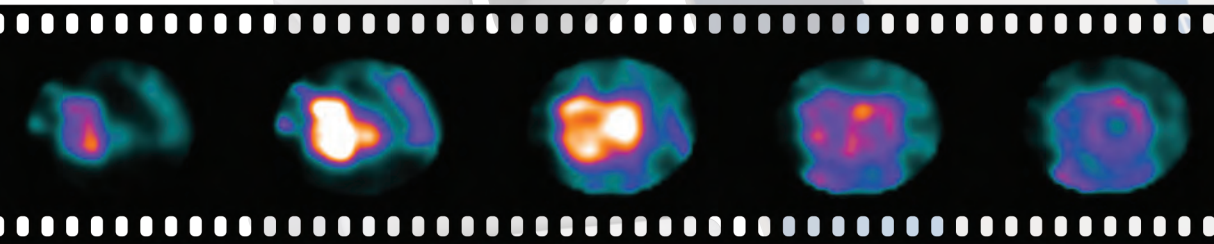


Industry Breakthrough

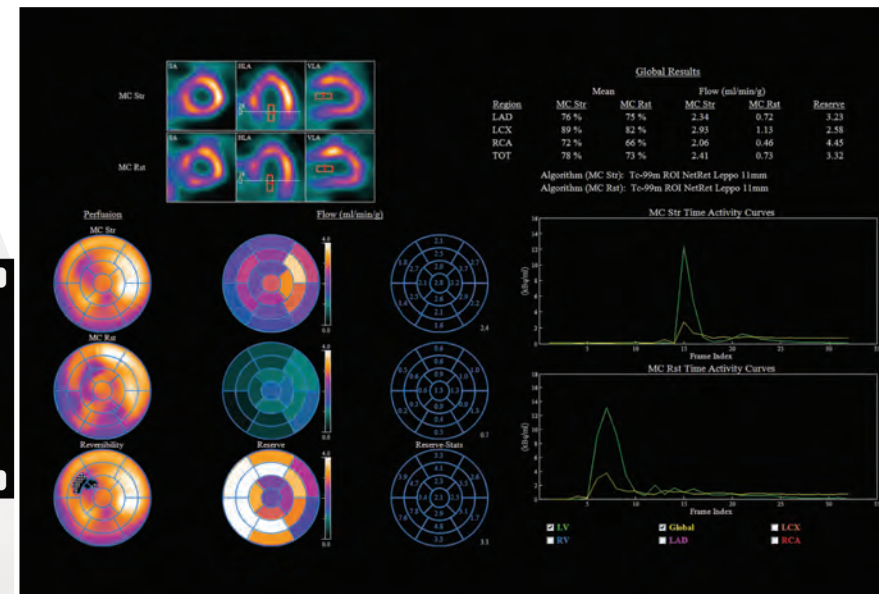


SPECTRUM
DYNAMICS MEDICAL

A Biosensors International Group Company



Dynamic SPECT Acquisition



Quantifying Myocardial Blood Flow

D-SPECT®
Cardiac Imaging System

Nuclear Cardiology in the 21st Century

In the 21st century, most nuclear cameras are still relying on Sodium Iodide crystals and vacuum tubes. Spectrum Dynamics Medical changed all that several years ago with the introduction of the first clinical Cadmium Zinc Telluride (CZT) based nuclear cardiac imaging system, the D-SPECT.®

The D-SPECT broke all the old paradigms with regards to nuclear imaging:

- New patient handling system offering unparalleled flexibility for technically challenging patients
- Modern gantry designed from the ground up for simplicity and reliability
- Innovative proprietary reconstruction algorithm that dramatically improves image quality
- Nine columns of CZT detectors with Tungsten collimators that open the door to new clinical applications

This unique hardware and reconstruction software enables what many industry experts said was not possible in SPECT...

- Gated SPECT acquisitions completed with no gantry motions in a couple of minutes
- Dose reductions to a fraction of where they are today
- Exceptional image resolution and quality
- Detector sensitivity up to ten times that of conventional cameras bringing Spectrum Dynamics Medical to the "holy grail" of nuclear cardiology - quantitation of coronary blood flow



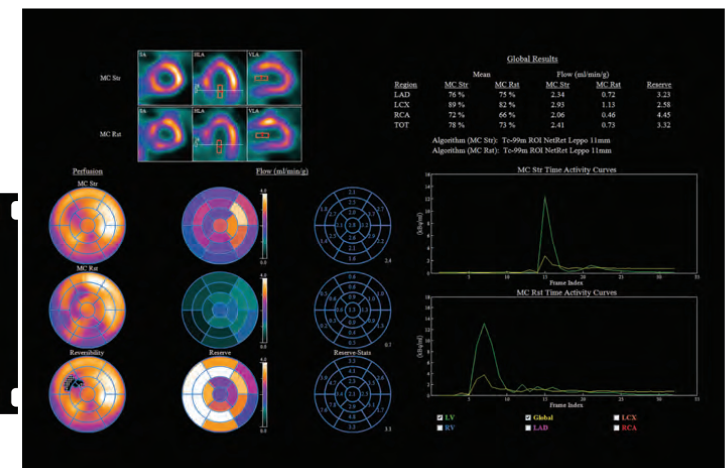
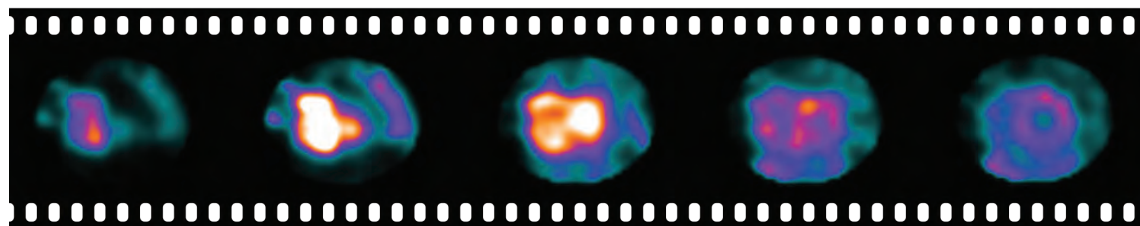
Dynamic SPECT...

A Breakthrough in Nuclear Cardiac Imaging

Gated SPECT acquisitions have been the mainstay of nuclear cardiac imaging for the last two decades, serving as a non-invasive way to image perfusion and wall motion. There have been small incremental improvements in quantitative software over the years, but new applications that provide clinicians with more and different diagnostic information simply have not been available, until now.

D-SPECT's unique implementation of CZT and reconstruction software lays the foundation for dynamic SPECT acquisitions. The D-SPECT rapidly images the bolus injection of ^{99m}Tc -Sestamibi as it passes through the left ventricle of the heart.

Once the appropriate cycles are rebinned/reconstructed, the D-SPECT quantitative software package analyzes the bolus and extraction of the radiopharmaceutical by the myocardium in the left ventricle to calculate the Coronary Flow Reserve (CFR) by coronary artery.



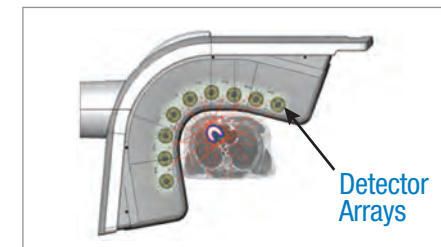
Where It All Starts...

Nine Digital CZT-Based Detectors

The CZT modules, which consist of CZT plus the electronics, are populated on a column with Tungsten collimators in front which channel the photons to the detector array. Using Tungsten collimators rather than lead eliminates potential lead X-ray which can degrade image quality.

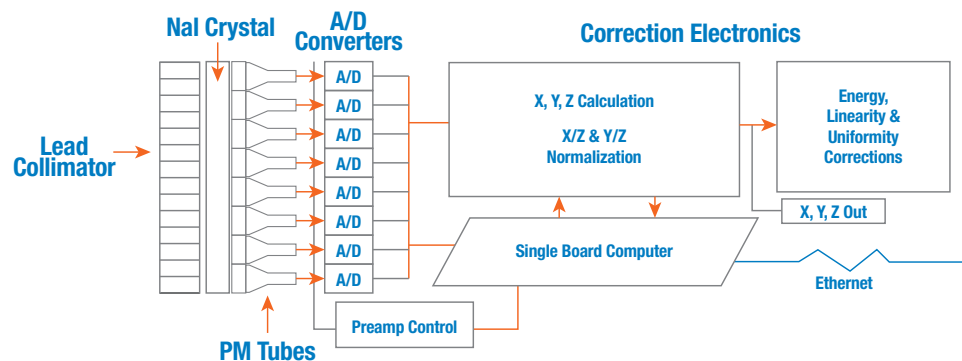
The semiconductor, CZT, combined with our unique implementation of hardware and software, offers superior performance advantages over Sodium Iodide. The most important is the dramatic improvements in sensitivity and energy resolution. This gives the D-SPECT the ability to acquire low dose and simultaneous multiple energy studies.

Detector Configuration and ROI-Centric Scanning

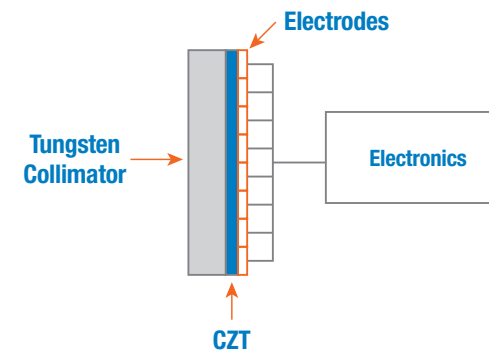


Comparison of Anger Scintillation and D-SPECT Solid State Technology

Anger Scintillator Technology



D-SPECT Solid State Technology

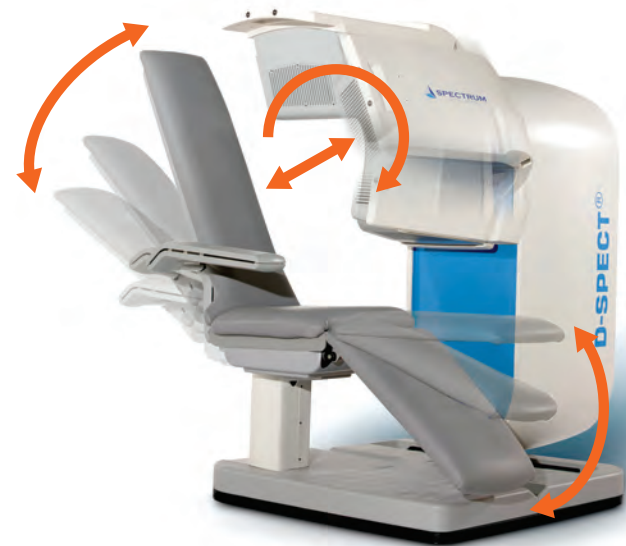


Gantry and Chair Design

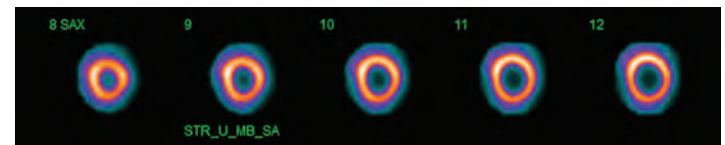
The D-SPECT gantry design is simple, yet elegant. The system is counter-balanced for easy and smooth motions. Gantry positions are locked in place with electromagnetic brakes.

This unique design provides several advantages including:

1. Very small footprint: 9'5" x 11', ideal for small rooms.
2. Open gantry design eliminates claustrophobia.
3. Flexible imaging chair can be fully-upright, supine or anything in between to fit any clinical requirement.
4. Unique gantry/detector design eliminates the need for the patient to place their left arm "behind the head", improving patient comfort and reducing the chance of motion.
5. Chair weight supports patients up to 542 lbs./246 kg. for morbidly obese patients.



The patient handling system's chair back and foot rest are fully adjustable, allowing the patient to be seated fully upright, supine or anything in between. The detector can be rotated for cephalic and caudal tilt as well as in and out for optimal positioning.



Patient is 540 lbs., 89 BMI, standard doses, TI stress and Tc rest. Note the exceptional image quality.

Acquisition and Advanced Reconstruction Algorithms

List Mode Acquisition

All acquisitions are acquired in list mode. This provides the capability to reframe the data, allowing the operator to change a number of different parameters.

- Adjust the R-Wave windows
- Apply scatter correction and process the multiple isotope acquisitions within seven different energy windows
- Adjust energy window or compare different energy windows for the same acquisition

Reconstruction

Our advanced reconstruction algorithm is based on an OSEM iterative algorithm with resolution recovery. Multiple reconstruction options are included within the reconstruction software.

The Model based reconstruction is a proprietary Spectrum Dynamics Medical algorithm and starts iterations from a Model of the LV instead of a uniform image.

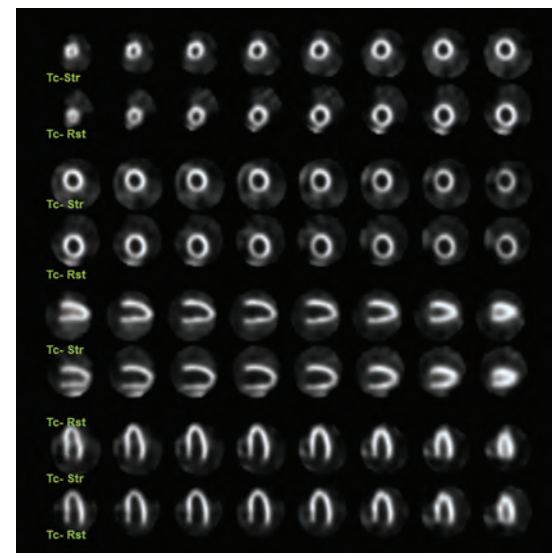
This Model is calculated on initial OSEM iterations using identified myocardium contours to create a Model that will be used as “Initial Guess.” This method helps the reconstruction algorithm converge more quickly on an optimal solution and demonstrates a significant improvement of image properties and quality.

Reconstructed Cardiac Phantom



Clinical and Workflow Benefits

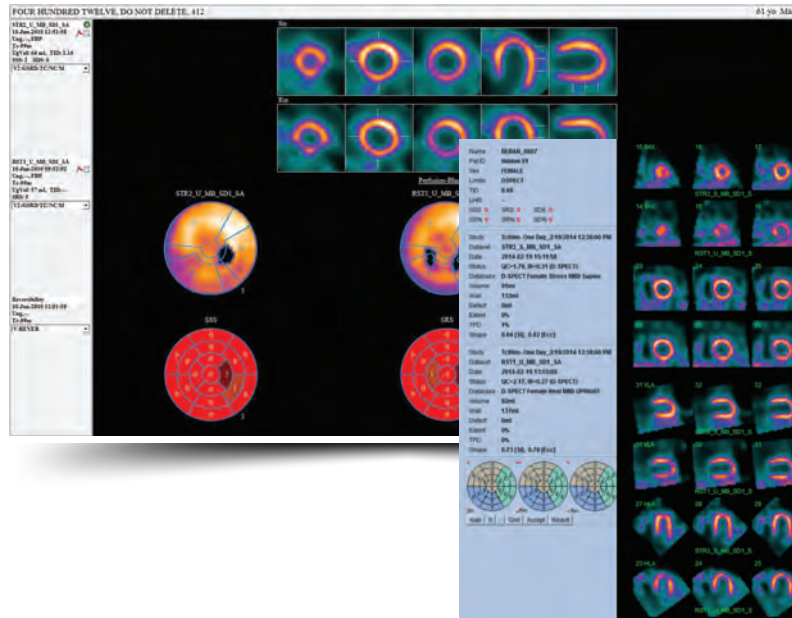
- **Fast results:** The D-SPECT can acquire a complete gated SPECT study in as little as two minutes, improving department workflow, enhancing patient compliance and reducing the chance of patient motion.
- **Image quality:** D-SPECT's count rich data sets combined with a proprietary reconstruction algorithm to ensure optimal spatial resolution and exceptional image quality.
- **Dose reduction:** The extremely high sensitivity of the D-SPECT detectors allows for dramatic reductions in injected dose. Patients and staff benefit from the lower radiation dose.
- **Simultaneous multi-isotope imaging (SDI):** The exceptional energy resolution of CZT allows the detectors to acquire multiple energies at the same time with minimal down scatter. This makes simultaneous stress and rest imaging possible with perfect image registration, as well as new advanced multi-isotope protocols such as ^{123}I MIBG or ^{201}Tl and $^{99\text{m}}\text{Tc}$ Sestamibi or Myoview.
- **Patient compliance:** The open gantry design and the ability of the CZT columns to "swivel" back and forth allows the nine detectors, in an L shaped array, to acquire data from the patients Left Posterior Oblique (LPO) to Right Anterior Oblique (RAO) without the need to rotate the detectors around the patient. This eliminates the chance of an acquisition collision, pinch points or claustrophobia that moving detectors can cause.



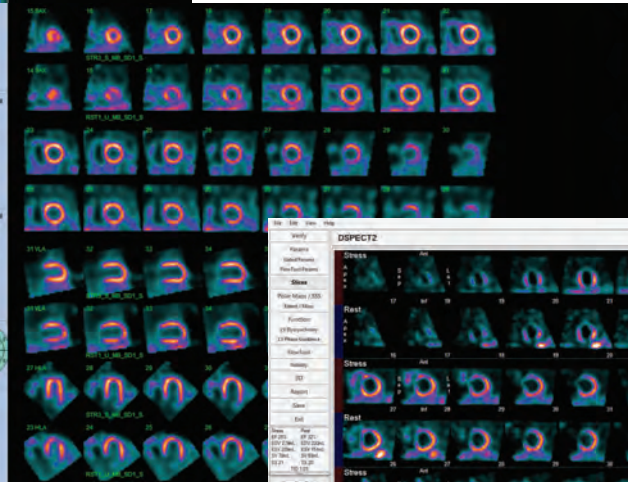
**Two-minute gated SPECT study
with standard doses**

Quantitative Software Packages

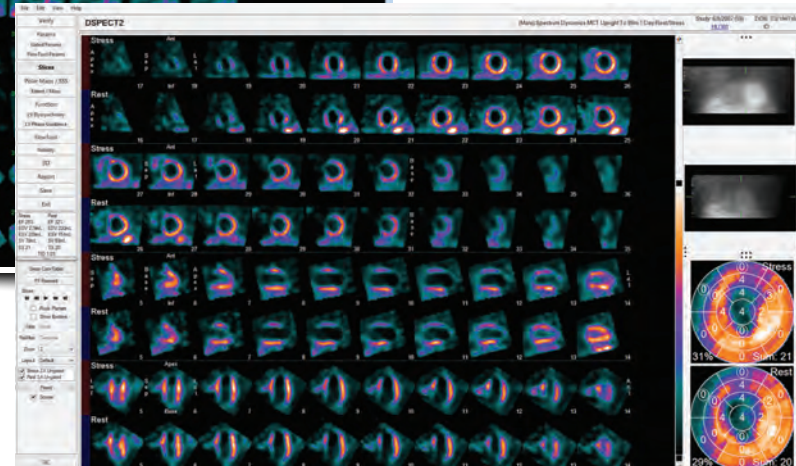
We offer the following quantitative software SPECT packages from:



**INVIA Corridor
4DM SPECT**



**Cedars-Sinai
QGS + QPS**

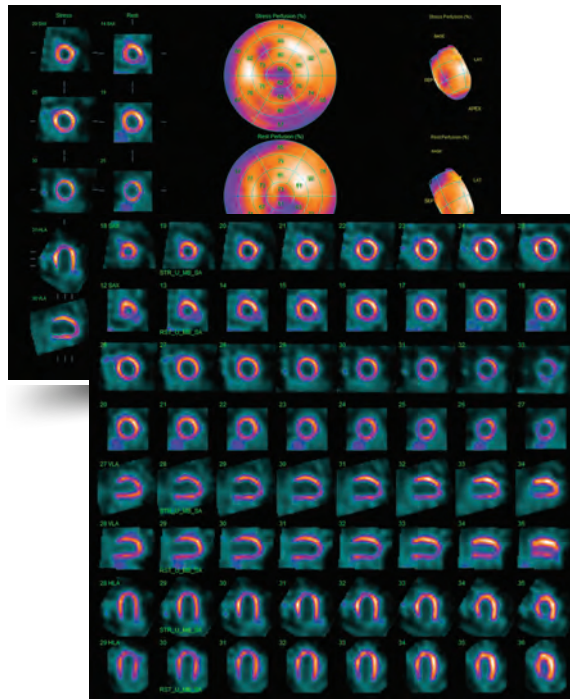


**Syntermed
Emory
Toolbox***

* Available in a Stand-Alone configuration only

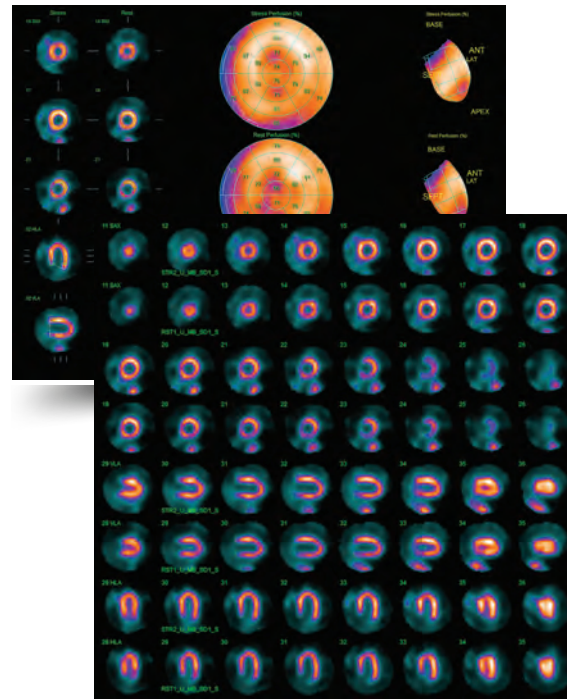
Image Gallery

Obese



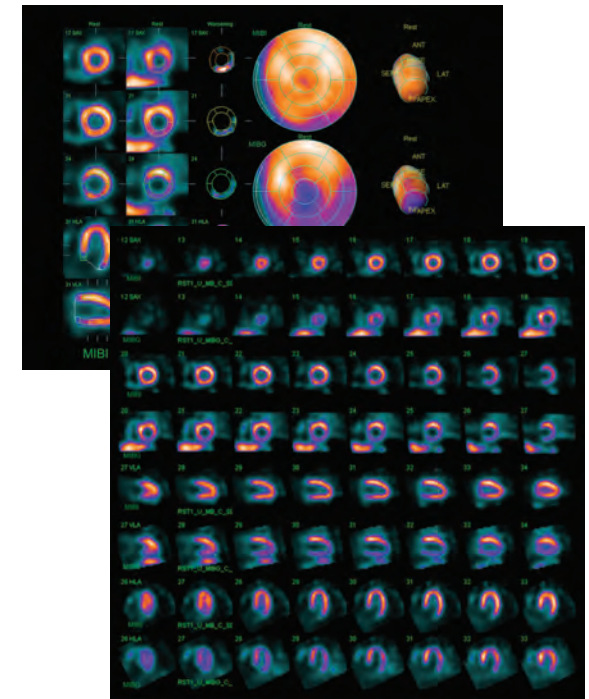
498 lbs., BMI 75.7

Ultra-Low Dose



5 mCi ^{99m}Tc -Sestamibi

SDI



^{99m}Tc -Mibi + ^{123}I -MIBG

Quality Control

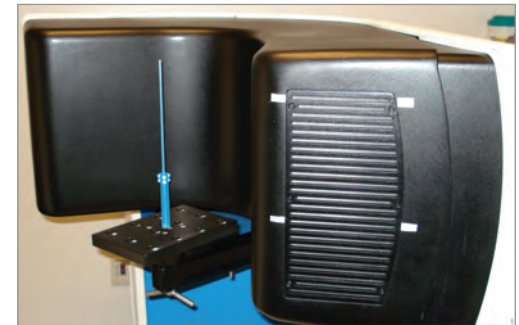
D-SPECT acquisition software incorporates a very simple to perform Co57 based quality control acquisition that is executed daily and checks all key imaging parameters prior to clinical imaging. The procedure only takes a couple of minutes (varies with source strength) to accomplish.

Connectivity

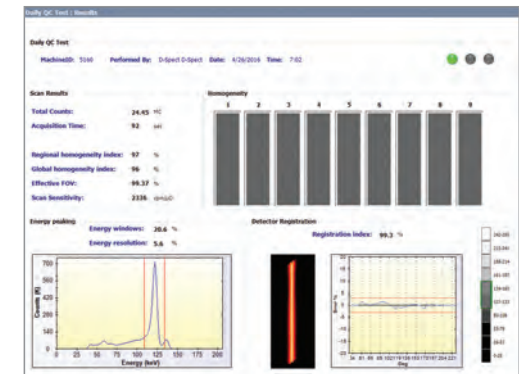
The D-SPECT can connect and transfer data back and forth to a wide variety of HIS/RIS systems, PACS servers and other imaging devices using the DICOM standard. If you have questions regarding specific devices, Spectrum Dynamics Medical personnel can work on-site with your IT department to demonstrate connectivity and data transfer procedures.



Daily QC Set-Up



Daily QC Results



Serviceability and Remote Diagnostics

The D-SPECT system was designed from the ground up with remote connectivity in mind. With the site's permission, regional specialists and/or factory trained engineers can log into your D-SPECT and perform almost any of the diagnostic technical functions a Field Service Engineer can complete on-site. With the exception of a part's replacement, it is often possible to correct or implement a workaround solution remotely, allowing imaging to continue while waiting for a technician to arrive on-site.

We have some of the most experienced service engineers throughout the world, but the best solution to a problem is to correct it before anyone even knows it exists. D-SPECT's built in remote connectivity makes this a reality.

Remote Service Diagnostics



Better Matters

Exceptional image quality, dramatic dose reductions and a path to new applications, D-SPECT® is the future.



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