IMAGING FOR LIFE

InterView™ FUSION

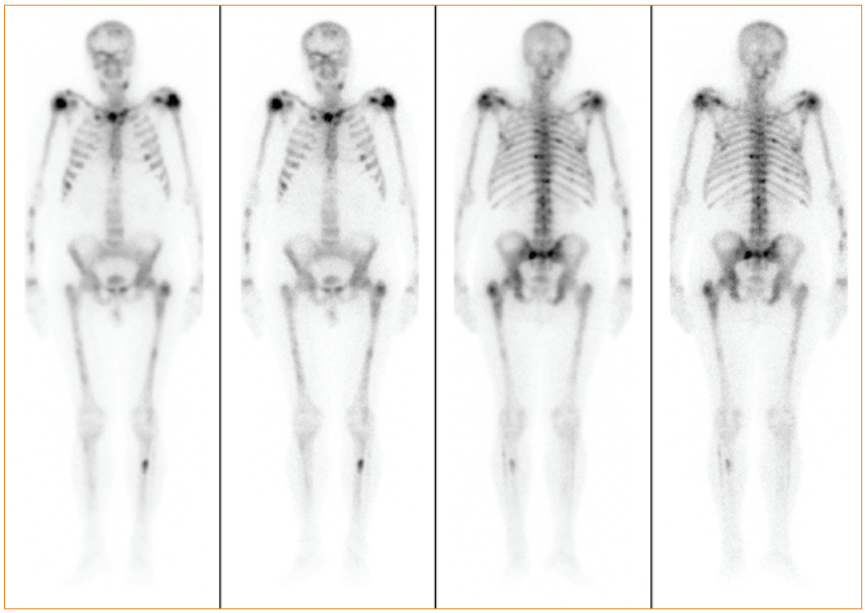
multimodality image processing workstation
for clinical applications

Visualizing and post processing your clinical SPECT-CT-PET-MRI images

Mediso
Medical Imaging Systems

Tera-Tomo™ 2D Planar Image Enhancement Module

The **Tera-Tomo™ 2D Planar** Image Enhancement Module is a dedicated solution for planar image enhancement. The module operates with state-of-the-art algorithms to enhance the image quality and detail of half-dose or double scan speed planar images to the level of standard acquisitions. The **Tera-Tomo™ 2D Planar** Image Enhancement package is fully automated due to its robust case specific analysis module, which adaptively fits the parameters to every case in order to achieve optimal image quality.



*Comparison of **Tera-Tomo™ 2D Planar** enhanced half-time and unprocessed normal scan-time planar acquisitions (patient study, 615 MBq, 72 kg, 180 cm, Images acquired by **AnyScan® S**)*

(a) ***Tera-Tomo™ 2D Planar*** *7.5 min. scan*

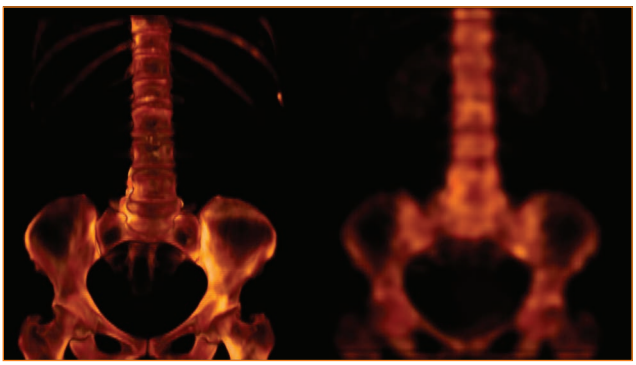
(b) Unprocessed 15 min. scan

(c) ***Tera-Tomo™ 2D Planar*** *7.5 min. scan*

(d) Unprocessed 15 min. scan

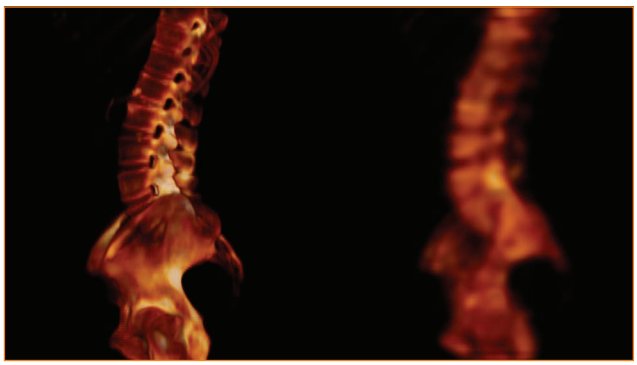
Tera-Tomo™ 3D SPECT Bone Enhancement on CT resolution

Tera-Tomo™ 3D SPECT Bone is a dedicated solution for enhancing bone structures of bone SPECT scans by using anatomical information originated from CT. The solution provides superior SPECT image quality due to the **Tera-Tomo™ 3D SPECT** reconstruction engine, operating on the resolution of the CT and considering CT bone structure information.



(a) ***Tera-Tomo™ 3D SPECT*** *Bone Enhancement (512x512 volume rendering),*

(b) ***Standard OSEM*** *(128x128 volume rendering),*



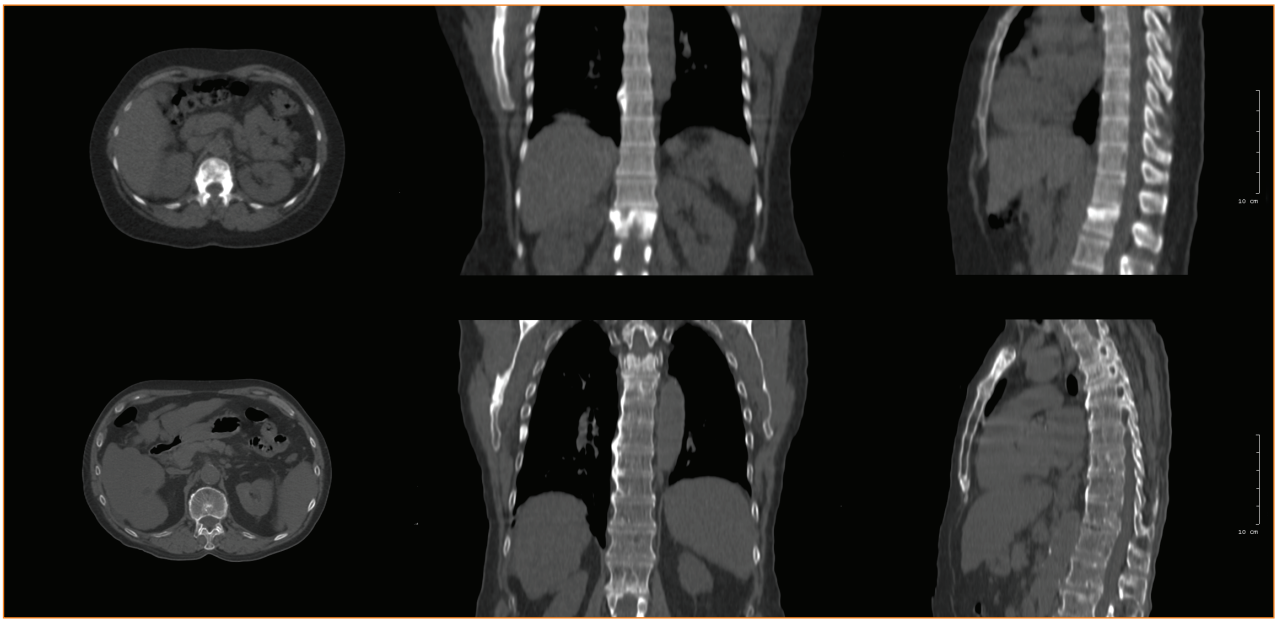
(a) ***Tera-Tomo™ 3D SPECT*** *Bone Enhancement (512x512 volume rendering),*

(b) ***Standard OSEM*** *(128x128 volume rendering),*

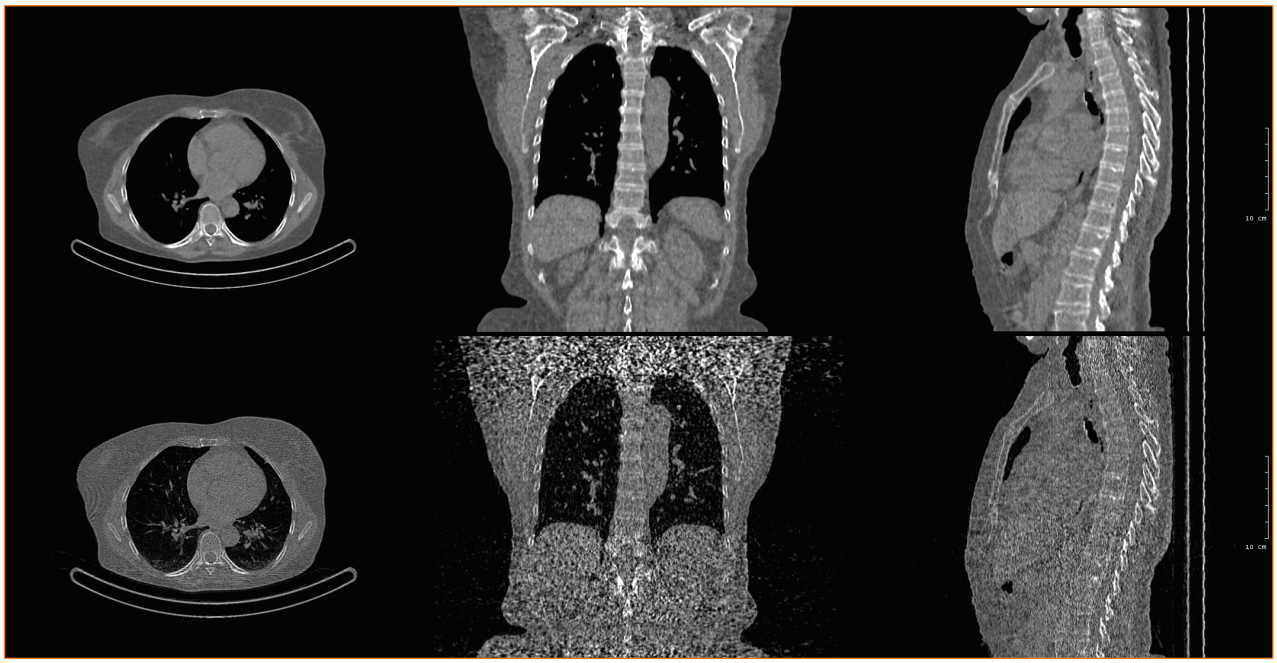
*Comparison of **Tera-Tomo™ 3D SPECT** Bone Enhancement and **Standard OSEM** reconstruction (patient study, 608 MBq, Images acquired by **AnyScan® SC** Research Edition)*

Tera-Tomo™ 3D CT Reconstruction Module

The **Tera-Tomo™ 3D CT** reconstruction engine implements a novel multi-material reconstruction method, which produces optimal patterns for all specific tissues in the body. In addition, the engine also handles metal artefacts since they are also handled as separate materials during reconstruction. The engine contains an advanced streak reduction as well as a novel edge-preserving noise compensation module. The **Tera-Tomo™ 3D CT** reconstruction is operated on multiple GPUs (Graphics Processing Units) for optimal performance [2,3,4]. The reconstruction engine, supplied with all the above solutions, allows ultra-low-dose CT acquisitions with excellent image quality without compromises, meaning radical dose reduction for patients.



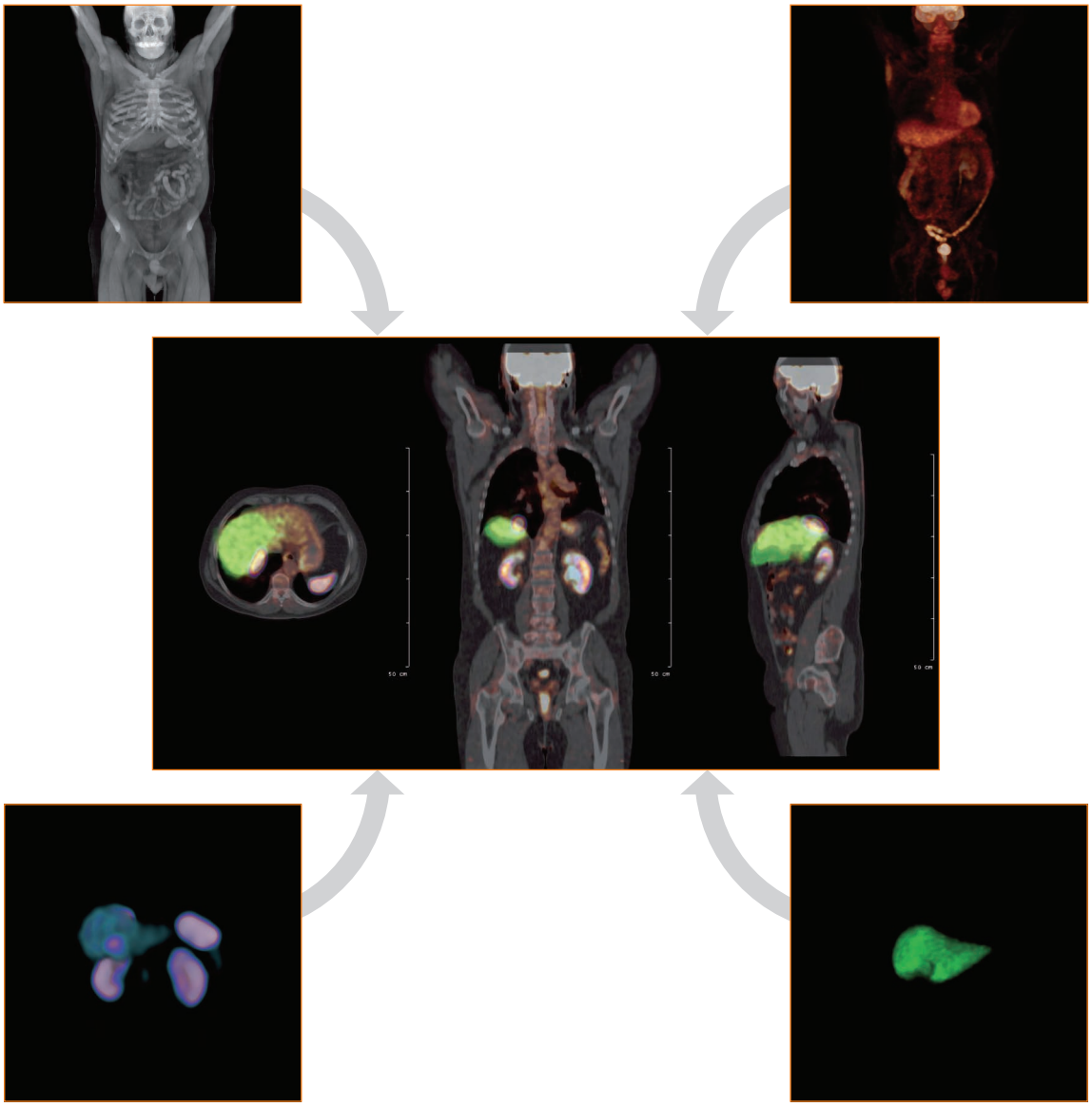
*Top: **Tera-Tomo™ 3D CT** reconstruction of an ultra-low-dose, 10 mAs acquisition*
*Bottom: **Standard FBP** reconstruction of a 50 mAs CT acquisition*
*(Images acquired by **AnyScan® C**)*



*Top: **Tera-Tomo™ 3D CT** reconstruction of an ultra-low-dose, 10 mAs acquisition*
*Bottom: **Standard FBP** reconstruction of the same CT acquisition (patient study, 10 mAs, 83 kg, 178 cm*
*Images acquired by **AnyScan® C**)*

InterView™ FUSION

InterView™ FUSION is a multi-modal visualization and evaluation software, developed by Mediso built on state-of-the-art technologies, novel image processing algorithms and tools for evaluating different medical imaging modalities. Multi-modal registration and fusion of SPECT, PET, CT and MRI studies is a core functionality of **InterView™** FUSION. Evaluation can be performed with the help of several specialized viewers and automated algorithms. Statistical measurements by ROIs, VOIs are present just as well as SUV representations for PET images. A wide range of function-specialized tools provide a well-detailed, fast and easy evaluation of medical images combining with advanced visualizations and interactions with flexible workspaces. Special segmentation methods provide quick and easy extraction of organs/regions from images. Basic arithmetic operations as well as spatial and frequency domain filters are available.

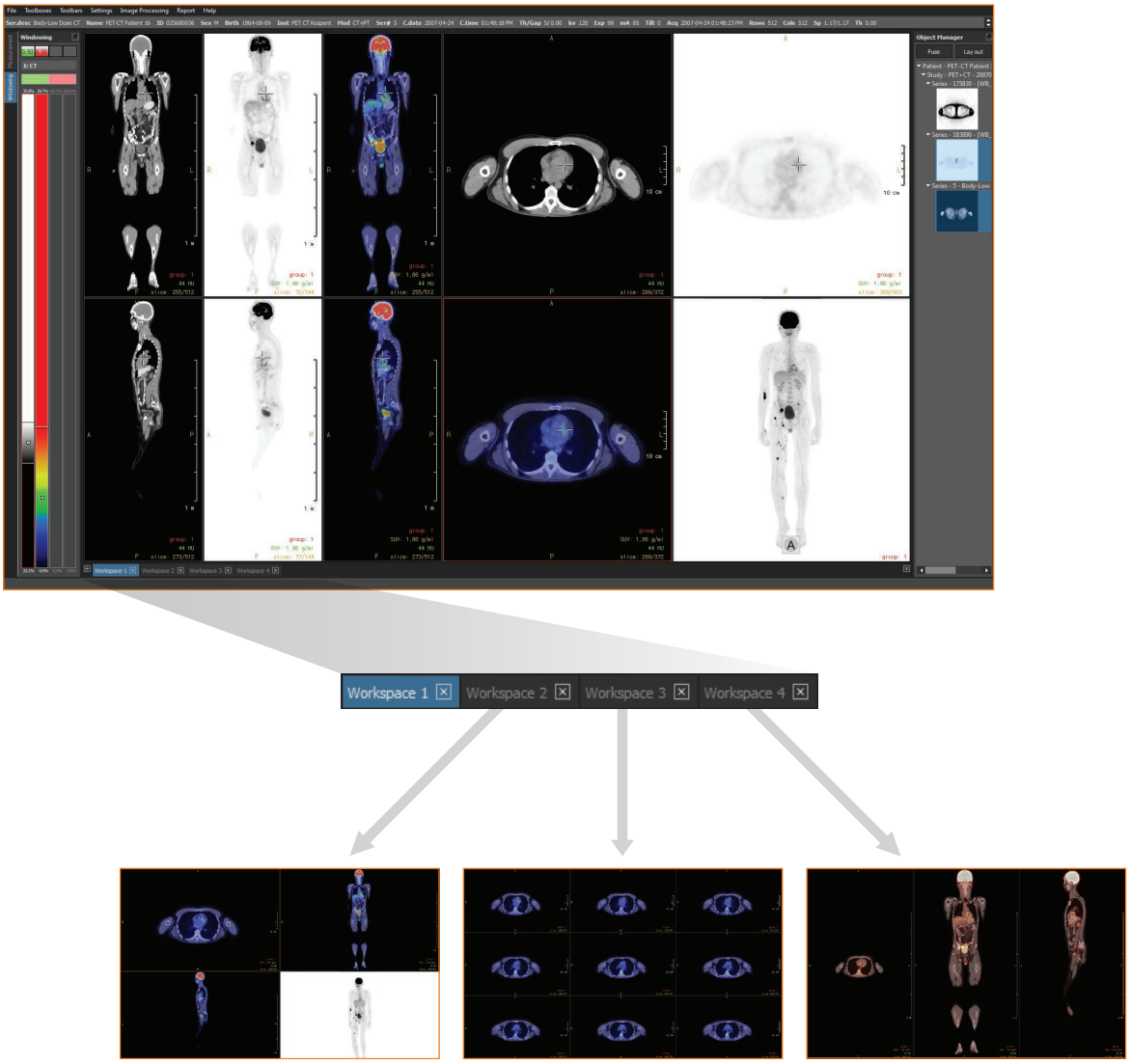


Multi-workspace architecture

Workspaces act like virtual screens organized on separate tabs. Whenever you are out of space on your screen, just open a new workspace and continue your work. Inter-workspace synchronization will be under your control to keep your work consistent.

Features

- Add/remove workspace
- User-defined layouts on workspaces
- Quick duplication of a viewer to a new workspace
- Quick workspace closing
- Inter-workspace synchronization of viewer arguments such as palette values and cursor position
- Maximum of 16 workspaces

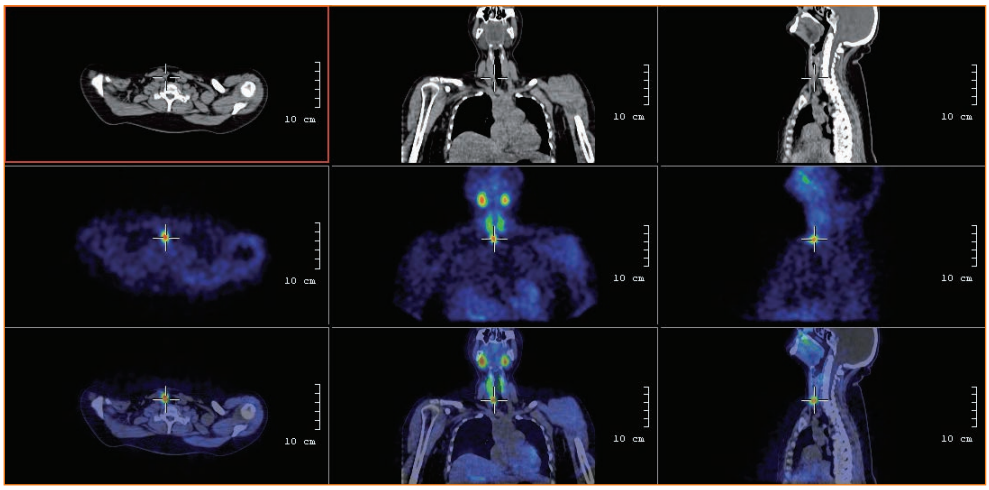


Flexible layout management

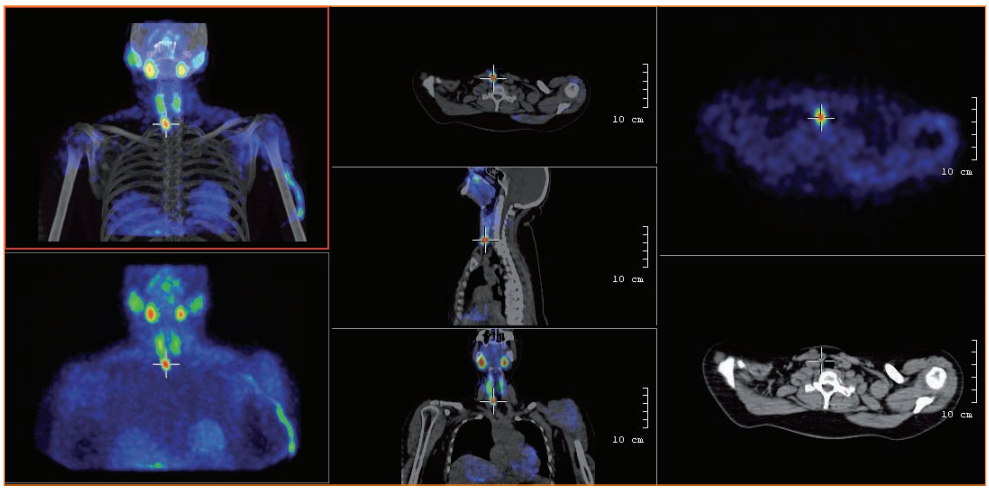
InterView™ FUSION layouts help organizing your viewers and provide saving and loading your own layouts. There is a huge amount of predefined layouts specialized for representing standalone modalities, multi-modal fusion, follow-up study pairs and general comparisons. An intelligent layout selector will automatically match and suggest default and user-defined layouts every time you load a new case. If you just want to see all your loaded images and fuse hybrid camera-made studies automatically, you will find a one-click solution for that too.

Features

- Automatic layout matching upon loaded studies
- Quick layout grid definition
- Quick layout item exchange by drag & drop
- Layout splitter lock/unlock, modification of splitters to build up special layouts
- Saving and loading of user-defined layouts
- Live layouts: splitter positions, orientation, viewer types, palette, flipping information, 3D viewer
- Cinema playing stage retrieving upon loading a user-defined layout every time you load a new case. If you just want to see all your loaded images and fuse hybrid camera-made studies automatically, you will find a one-click solution for that too.



A factory-default SPECT-CT layout representing a ^{99m}TC-MIBI adenoma SPECT-CT study



A user-defined layout representing the same SPECT-CT study

Viewers – from basic to extended

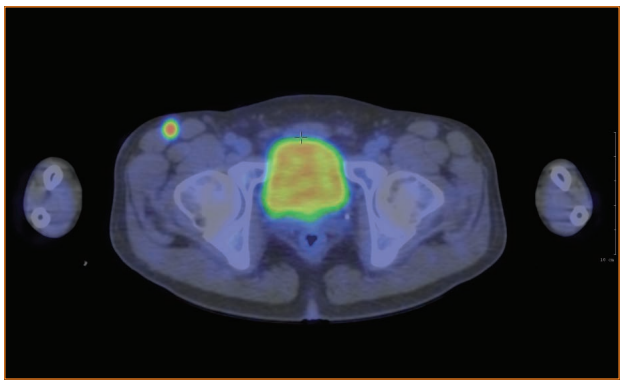
Viewers are core functionalities of **InterView™** FUSION covering a wide range of features from basic interactions to advanced extended fusion techniques. There are several image and plot viewers for image and derived data representation that aid proper evaluation. All image viewers provide **Extended Fusion** functionality by the extended fusion engine (see page 9).

Features

- Single / dual / triple / quadruple fusion of multi-modal static and dynamic images
- Labels for representing text information inside of the viewers (user can define the list of labels)
- Grouping of viewers to synchronize their cursor position and/or palette settings
- Radiological, Interventional Radiological and Pre-Clinical display conventions
- Real-time rendering to passive 3D-screens

Volume viewer

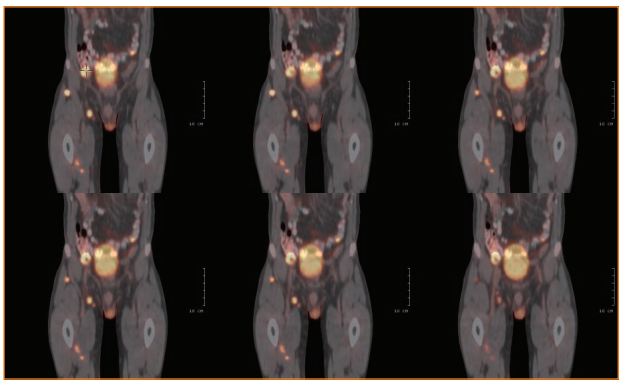
Displays images from a main axis (Axial, Coronal and Sagittal)



An ^{18}F-FDG PET-CT melanoma study in an axial Volume Viewer

Tiled viewer

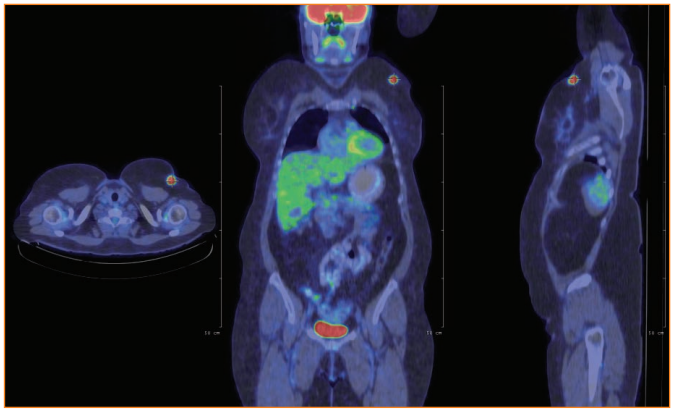
Displays consecutive slices of images from a main axis (Axial, Coronal or Sagittal) in a tiled view.



The same study in a coronal Tiled viewer

Unified volume viewer

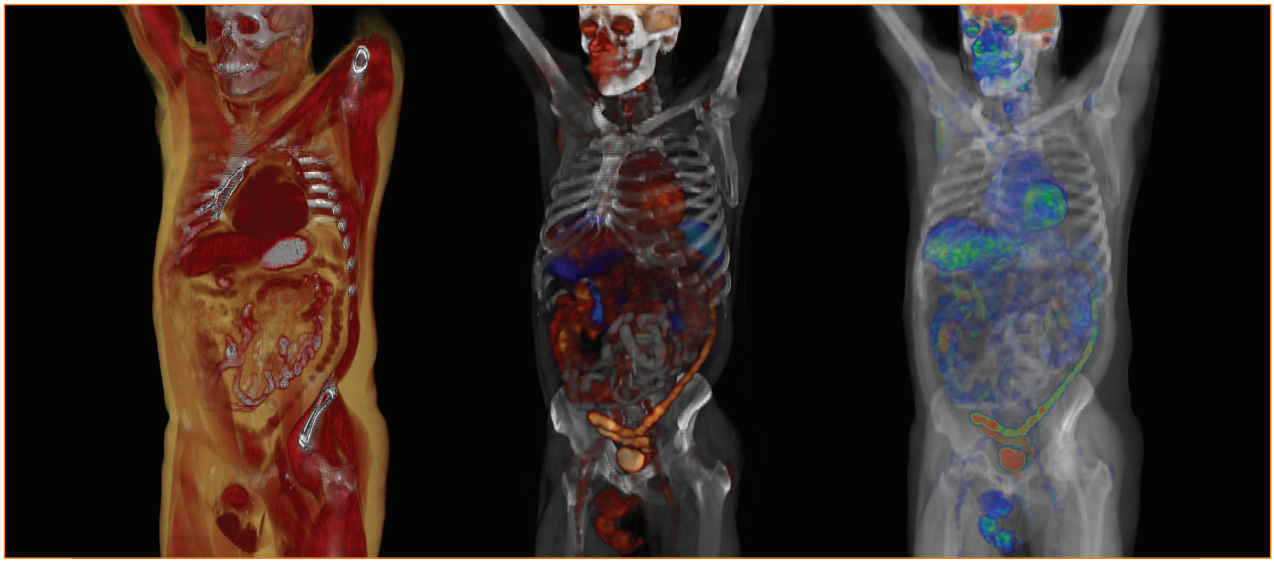
Displays images from three main axes (Axial, Coronal and Sagittal)



An ^{18}F-FDG PET-CT study in a Unified Volume Viewer

Volume Rendering (VR) viewer

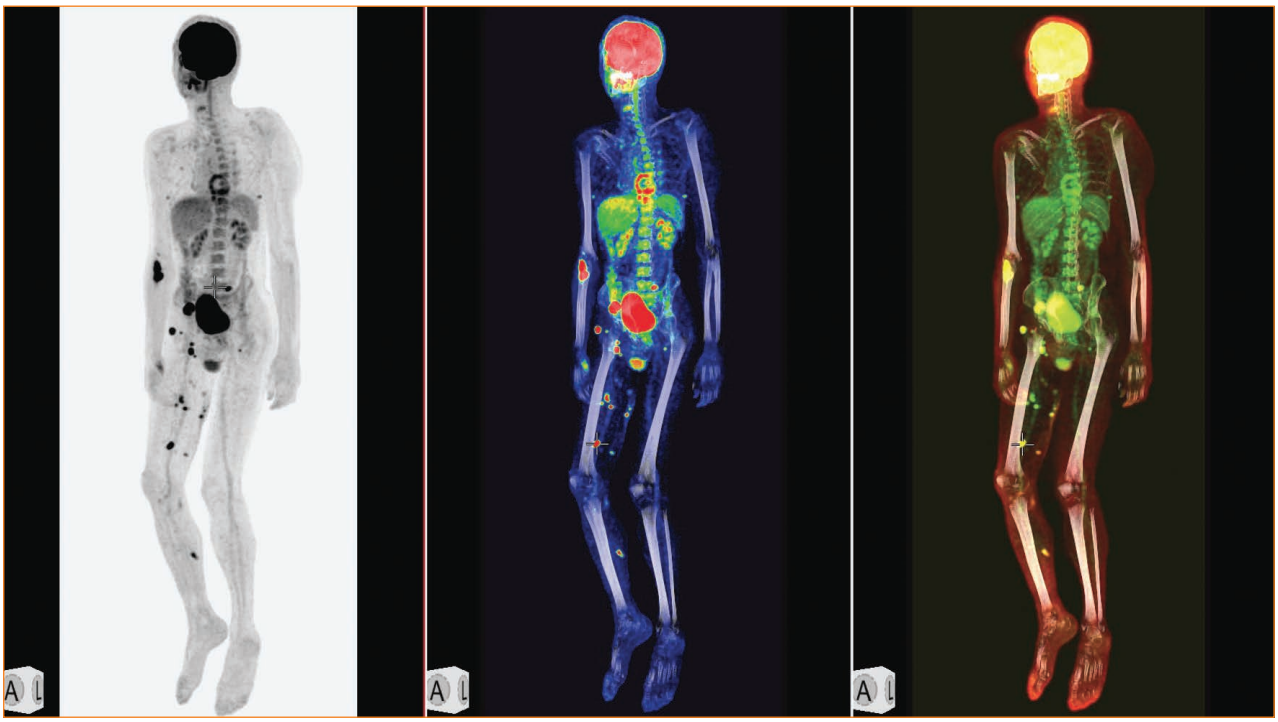
Displays images in a three dimensional real-time, free rotational volume rendering view.



Left: 3D VR of a CT with surface cut plane. Middle: 3D VR of a ^{18}F-FDG PET-CT with non-linear alpha functions Right: 3D VR of the same PET-CT with different alpha functions and palettes.

Maximum Intensity Projection (MIP) viewer

Displays images in a three dimensional real-time, free rotational maximum intensity projection view.



An ^{18}F-FDG PET (standalone), AC PET-CT (dual fusion) and AC PET - NAC PET - CT (triple fusion) melanoma study in a VR Viewer

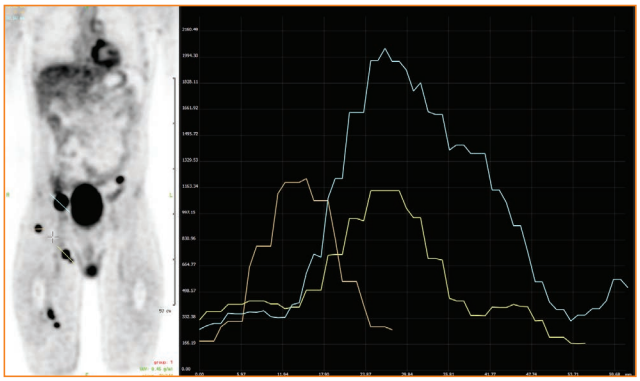
Viewers – from basic to extended

Time Activity Curve Viewer

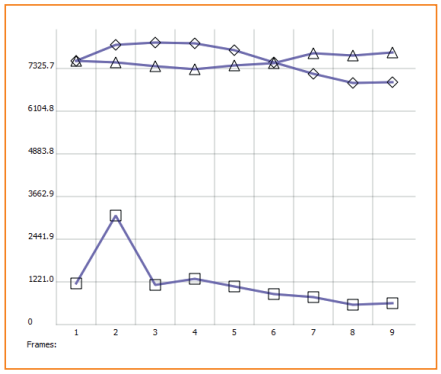
- Displays multiple statistics of ROIs and VOIs in the following ways:
  - Multiple Column, Line or Line with markers statistical representation of static image derived ROI/VOI values
  - Multiple Time Activity Curves (TAC) of ROIs/VOIs derived from dynamic data with multiple statistics (sum, mean, stdev., etc.)
- Exports TAC values to excel compatible file format

Profile Curve Viewer

- Displays multiple Profile Curves of Rulers
- User-defined radius to determine regions around Ruler for Profile Curve generation
- Mean, Minimum and Maximum of voxels in the radius
- Exports Profile Curve values to Excel compatible file format



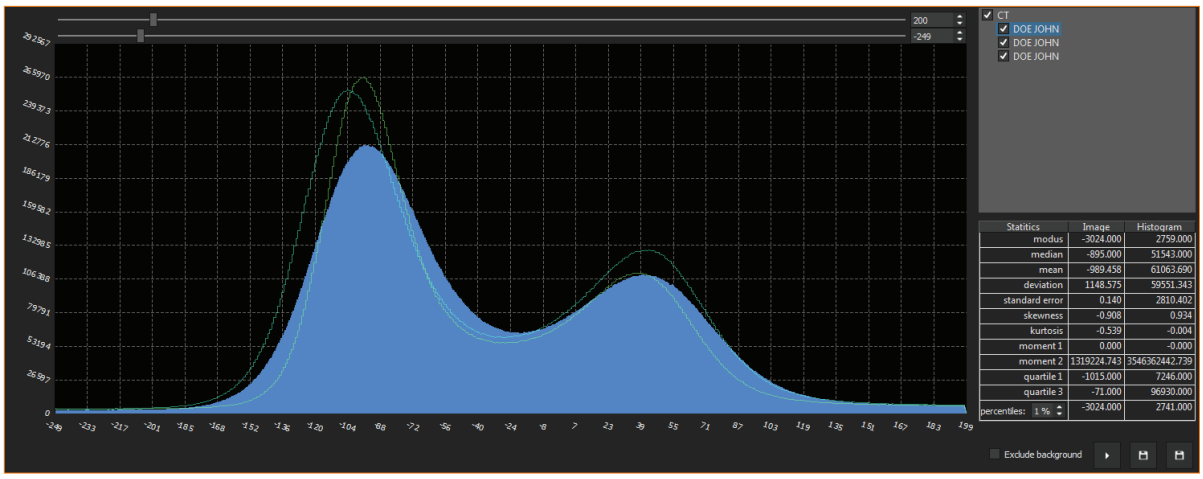
Multiple Profile Curves of hot spots over a melanoma PET case.



Mean, deviation and minimum of an isocount VOI over time series in a TAC viewer

Histogram viewer

- Displays multiple histograms (density functions) of images and ROI/VOI data.
- Allows real-time histogram interval changes
- Performs real-time histogram statistics calculation based on interval changes
- Exports histogram values with different binning techniques into excel compatible file format



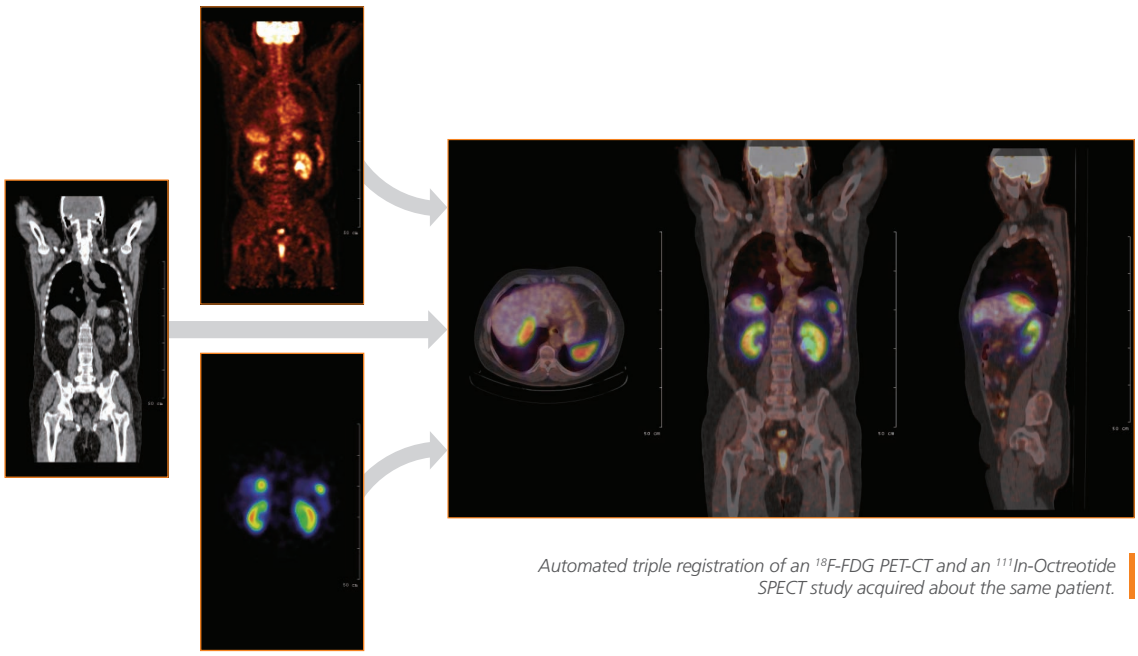
Histogram viewer representing HU density functions in (-200,200) HU range of three CTs acquired about the same patient

Fusion – extended fusion engine

InterView™ FUSION operates with a state-of-the-art extended, modality independent image registration engine, which supports automated group-wise registration [1][2][3][4][5], palette threshold driven registration and advanced plane sampling techniques [6]. The engine is optimized to operate with any kind of modalities and with up to 4 images in parallel. Manual and automated registrations can be performed in any combination, while an automated logging system stores all interactions and provides saving or undoing registration steps. The group-wise framework makes sure that if one series of a group is superimposed, all other group members are automatically superimposed as well without the need of user interactions. Registered images can be exported to standard PACS or local directory. The determined transformations can be applied any time to any image.

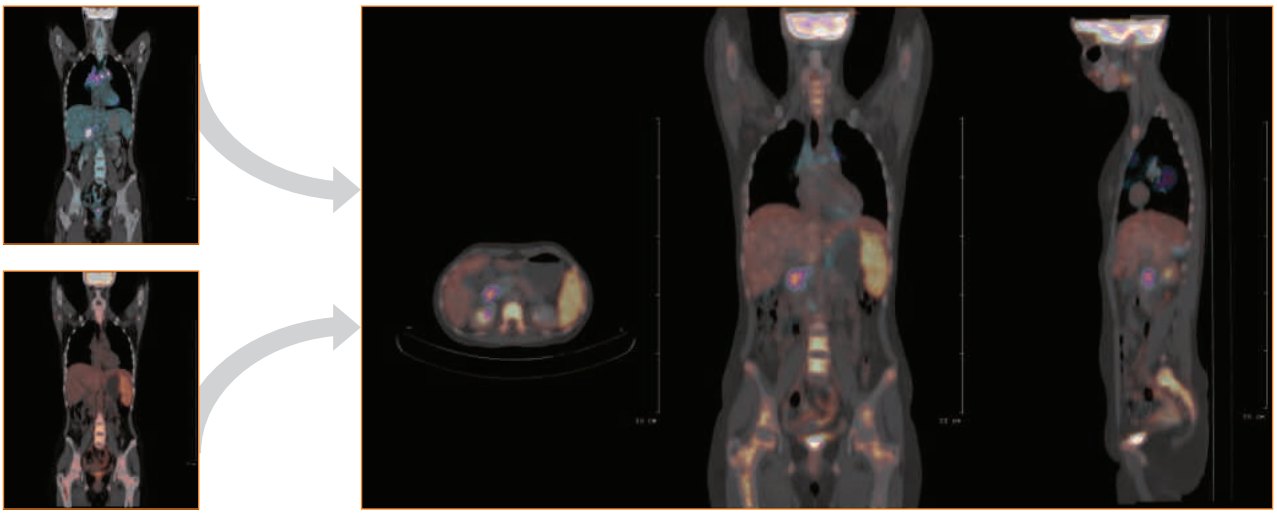
Features

- Registration techniques:
  - Manual rigid and affine registration
  - Semi-automated non-linear landmark point pair based registration
  - Fully automated rigid, affine and non-linear registration
- Sampling modes:
  - uniform (conventional)
  - planes [6]
- Sampling spaces: union, intersection, user-defined bounding box
- Hierarchical registration (coarse to fine method)
- Pre-localization registration method: accurate when the size of the images is significantly different
- Palette-driven similarity measurements: The algorithm operates on intensity ranges that users can see based on actual palette low-high range.

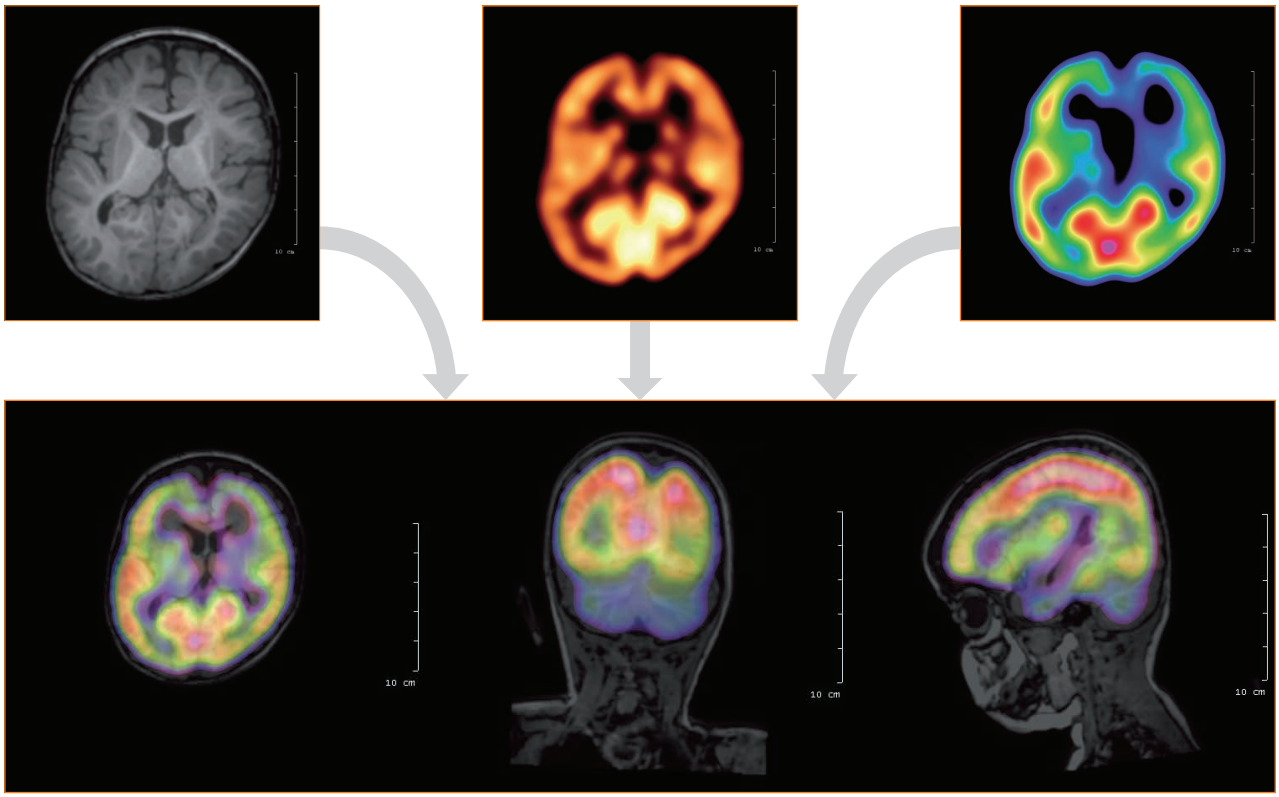


Automated triple registration of an ^{18}F-FDG PET-CT and an ^{111}In-Octreotide SPECT study acquired about the same patient.

- 1: L.Papp, M. Zuhayra and Reinhard Koch: Triple-Modality Normalized Mutual Information Based Medical Image Registration of Cardiac PET/CT and SPECT Images; Comparison with Triple MI and Dual NMI Methods. Bildverarbeitung für die Medizin, Informatik aktuell, 2009, Part 15, 386-389, Springer Berlin Heidelberg
- 2: L. Papp, M. Zuhayra, E. Henze, et al: Extended Normalized Mutual Information for Lung SPECT - CT Registration. Bioinformatics and Biomedical Engineering, 2009. ICBBE 2009. 3rd International Conference on, 11-13 June 2009, pp. 1-3, Beijing, China
- 3: L. Papp, N. Zsoter, G. Szabo, et al: Parallel registration of multi-modal medical image triples having unknown inter-image geometry. IEEE Eng Med Biol Soc. 2009; pp. 5825-5928
- 4: T. Derlin, Z. Toth, L. Papp, et al: Correlation of Inflammation Assessed by 18F-FDG PET, Active Mineral Deposition Assessed by 18F-Fluoride PET, and Vascular Calcification in Atherosclerotic Plaque: A Dual-Tracer PET/CT Study. J Nucl Med 2011; 52:1020–1027
- 5: T. Derlin, J. D. Busch, C. Wisotzki, et al: Intraindividual Comparison of 123I-mIBG SPECT/MRI, 123I-mIBG SPECT/CT, and MRI for the Detection of Adrenal Pheochromocytoma in Patients With Elevated Urine or Plasma Catecholamines Clinical nuclear medicine 2012; DOI:10.1097/RLU.0b013e318263923d
- 6: L. Papp, N. Zsoter, P. Bandi, et al: An extended registration framework for the triple registration of IBZM SPECT, DATSCAN SPECT and MRI brain images to support the evaluation of brain dopamine receptor scintigraphies. 33rd Annual International Conference of the IEEE EMBS Boston, Massachusetts USA, , 2011, pp. 8025 - 8028.



Automated quadruple registration of a primary and interim ^{18}F-FDG PET-CT image pairs



Automated triple registration of a brain MRI, an ^{18}F-FDG PET and a ^{99m}Tc-Neurolite SPECT

Measurements

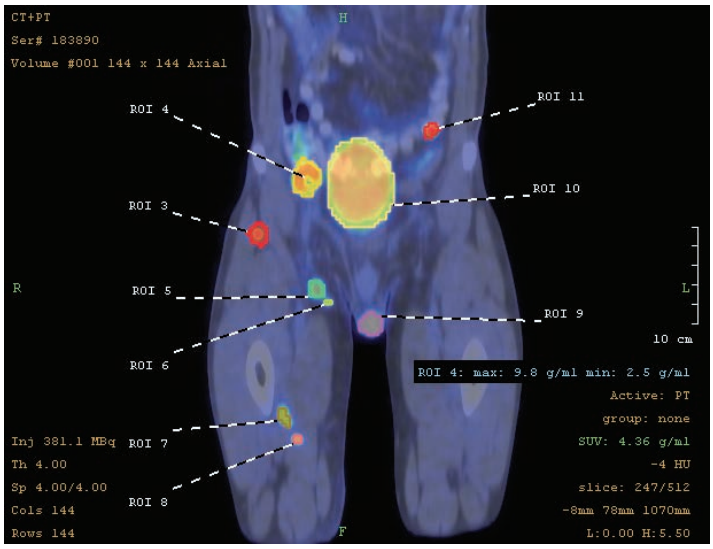
An extensive ROI and VOI arsenal is available in **InterView**™ FUSION to support the evaluation process. Detailed statistical values can be accessed in our ROI/VOI table, which supports Excel-compatible calculations. Scope of ROI/VOI calculations can be changed from an image even to the whole application. Beyond regional measurement tools, markers, rulers, bevels are also accessible in **InterView**™ FUSION. Exporting all measurements to excel as well as saving the ROIs/VOIs is provided. Exporting ROIs/VOIs to standard **DICOM RT** format for radiation therapy planning is a basic functionality of **InterView**™ FUSION.

ROI/VOI types

- Rectangle ROI
- Ellipse ROI
- Polygon ROI
- Freehand ROI
- Interpolated polygon ROI
- Interpolated ellipse ROI
- Isocount 1 and 2 point based ROI / VOI
- Isocount threshold based ROI / VOI
- Box VOI
- Sphere VOI
- Gravity ROI / VOI
- Brush / Erase tool

Measurement types

- Ruler
- Bevel
- Markers



Multiple isocount VOIs over a coronal PET-CT image

ROI statistics

General Statistics:
Deviation, Mean, Max, Min, Sum, TLG (PET), Volume, Max. Diameter, Entropy, Homogeneity, Size-Zone Variability, Intensity Variability, Contrast, Correlation, Skewness, Kurtosis, Busyness, Complexity, Length (Ruler), Degrees (Bevel), Diameter

Volumetric Zone Length Statistics:
Short-Zone Emphasis, Long-Zone Emphasis, Low Grey-Level Zone Emphasis, High Grey-Level Zone Emphasis, Short Zone Low Grey-Level Emphasis, Short Zone High Grey-Level Emphasis, Long Zone Low Grey-Level Emphasis, Long Zone Low Grey-Level Emphasis, Long Zone High Grey-Level Emphasis, Grey-Level Non-Uniformity, Zone Length Non-Uniformity, Zone Percentage

Volumetric Run Length Statistics:
Short Run Emphasis, Long Run Emphasis, Low Grey-Level Run Emphasis, High Grey-Level Run Emphasis, Short Run Low Grey-Level Emphasis, Short Run High Grey-Level Emphasis, Long Run Low Grey-Level Emphasis, Long Run High Grey- Level Emphasis, Grey-Level Non-Uniformity, Run Length Non-Uniformity, Run Percentage.

ROI Evaluation Tools

- ROI / VOI arithmetic operations: Union, Intersection of selected ROIs / VOIs
- Copy / Paste ROI / VOI between any images
- Calculation board under the ROI table is available
- Calculation cells accept simple Excel-like functions: +, -, *, /, SUM(), MEAN()
- Exporting the ROI table with the optional calculation board
- Saving and loading ROIs/VOIs

Toolboxes – arms for advanced interactions

Toolboxes control, manipulate, change or modify the visuals or data in the viewers. Toolboxes can be floating or docked into one of the side panels. The stage of a toolbox is saved to the user's settings, hence every **InterView™** FUSION user can individually set up the view of ones **InterView™** FUSION instance.
The following tools are available in **InterView™** FUSION:

Quick functions

Invert palette, zoom tools, reset view, set common zoom, lock cursors, overlay On/Off, change orientation, reorient, move view to center, etc.

Mouse modes

3D cursor, slice navigation, translate, zoom, windowing, slice thickness, etc.

Movie

- Start/stop playing, direction of playing (forward, backward, alternate), movie in space and time domain, adjust movie speed
- Flip tools: Flip Left-Right, Anterior-Posterior and Head-Feet

Bookmark

Stores three dimensional cursor points that can be recalled any time over any images.
- Add / Delete / Delete all points
- Rename bookmark points

Blending

- Change blending weights of images with slider (dual fusion), triangle (triple fusion) or rectangle control (quadruple fusion)
- Switch on/off images in a fusion
- Turn on/off functional modalities quickly

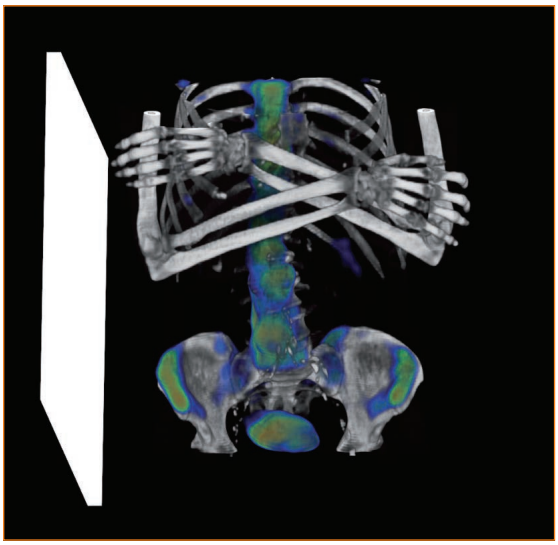
Palette

- Huge amount of predefined color schemes for all modalities
- Favorite palette list for all modalities (user-defined)
- Modifiable control points of key colors that are the base of a color scheme
- Color scheme interpolation type setting
- Window presets for CT window (lung, bone, brain, fat, etc.)
- Alpha blending function (for 3D-rendering)
- Synchronization of alpha and window low-high values
- Low-high, min-max, center-width modifications
- Non-linear color scaling (gamma), brightness, contrast modification
- Reset (to DICOM based min-max), dynamic reset (to full range min-max), expand (to current low-high range) functionalities
- Complete user freedom to manipulate, save and retrieve all above features by the Palette Manager
- User-defined color schemes

Toolboxes – arms for advanced interactions

Cut / Crop

- Freehand Cut/Crop: Inner (cut) or outer (crop) voxels of the projected freehand shape are deleted.
- ROI Cut/Crop: Based on existing ROIs/VOIs the inner (cut) or outer (crop) voxels are deleted.



A 3D volume rendering of a bone SPECT-CT study with a plane

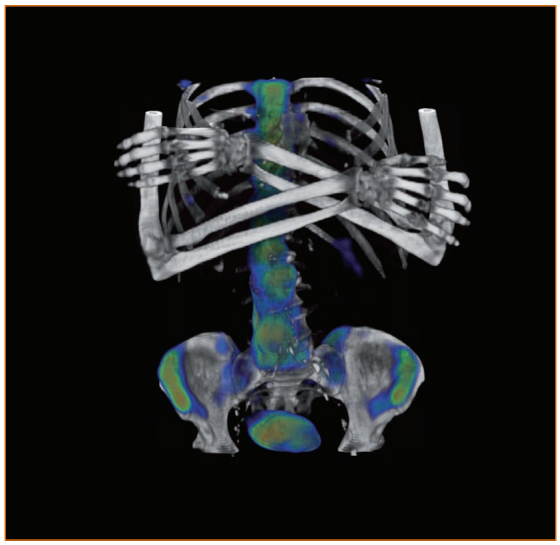
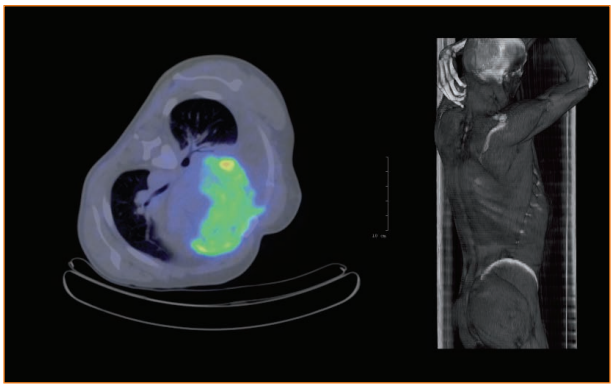
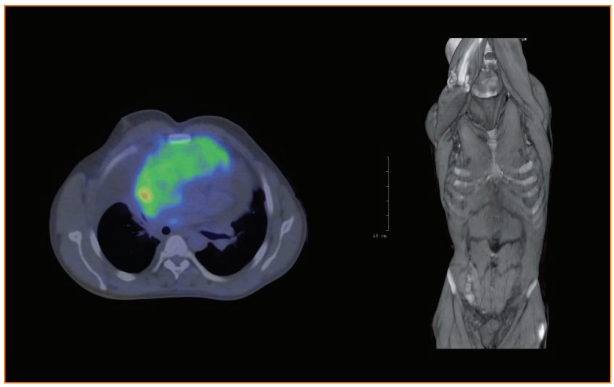


Image after deleting plane by freehand cut

Reorientation

- Two reorientation modes: arrow (heart and general) and grid (brain)
- Reorient fused images together





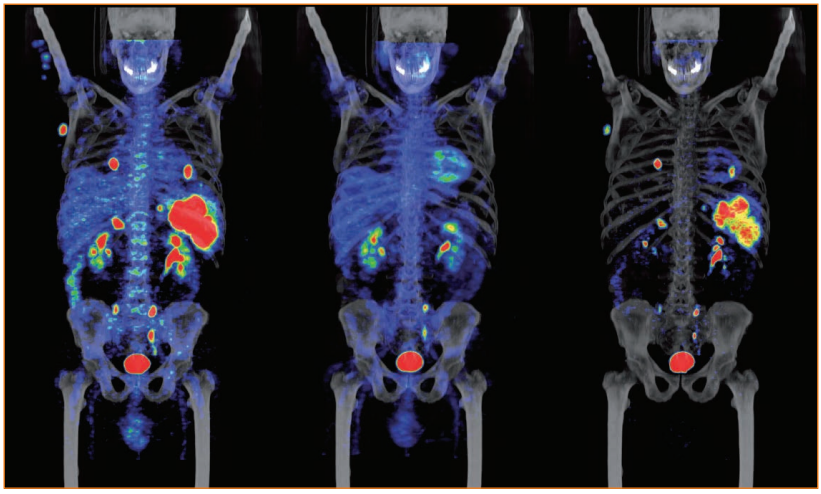
Freehand cut of the patient bed on an axial volume viewer and reorientation of the fused images. Synchronized rendering in a 3D VR viewer

Arithmetic operations and filters

Arithmetic operations

InterView™ FUSION includes several arithmetic operations that can normalize image size and resolution to make the images comparable. The arithmetic framework operates with all kind of modalities.

- The following operations are present: add (+), subtract (-), multiply (*), minimum, maximum, mean value, absolute difference.
- Individual weights for both images can be set.
- The result sampling and image size of the result image can be seat as Min, Max, Image 1 and Image 2 sampling size.

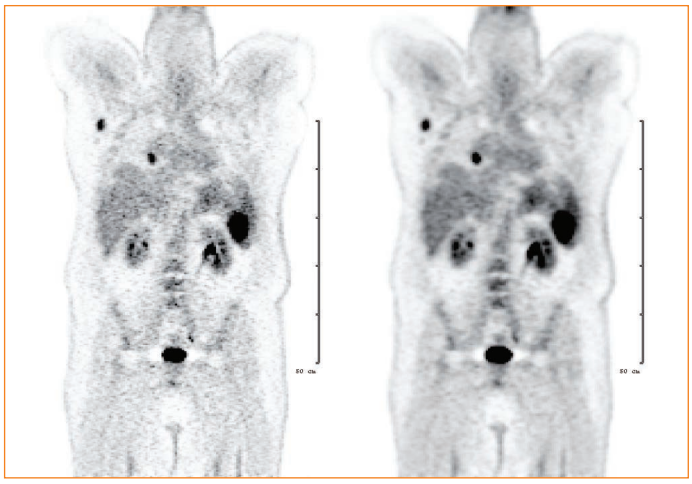


First, second and the absolute difference of follow-up PET pairs fused with their corresponding CT

Filters

Building on multi-thread technology, **InterView**™ FUSION provides fast 2D- and 3D-filters on both spatial and frequency domain. Filters can be hived and their result can be saved as a new image.
In-built 2D- and 3D-filters operate on domain and frequency level.

- Spatial Domain Filters: Bilateral, Non-Local Mean, Median, Windowed Median, Gaussian, Laplacian, Morphological Gradient, Morph. Close, Morph. Open
- Frequency Domain Filters: Metz, Wiener, Butterworth, Gaussian, Hamming, Ramp, Parzen, Shepp-Logan



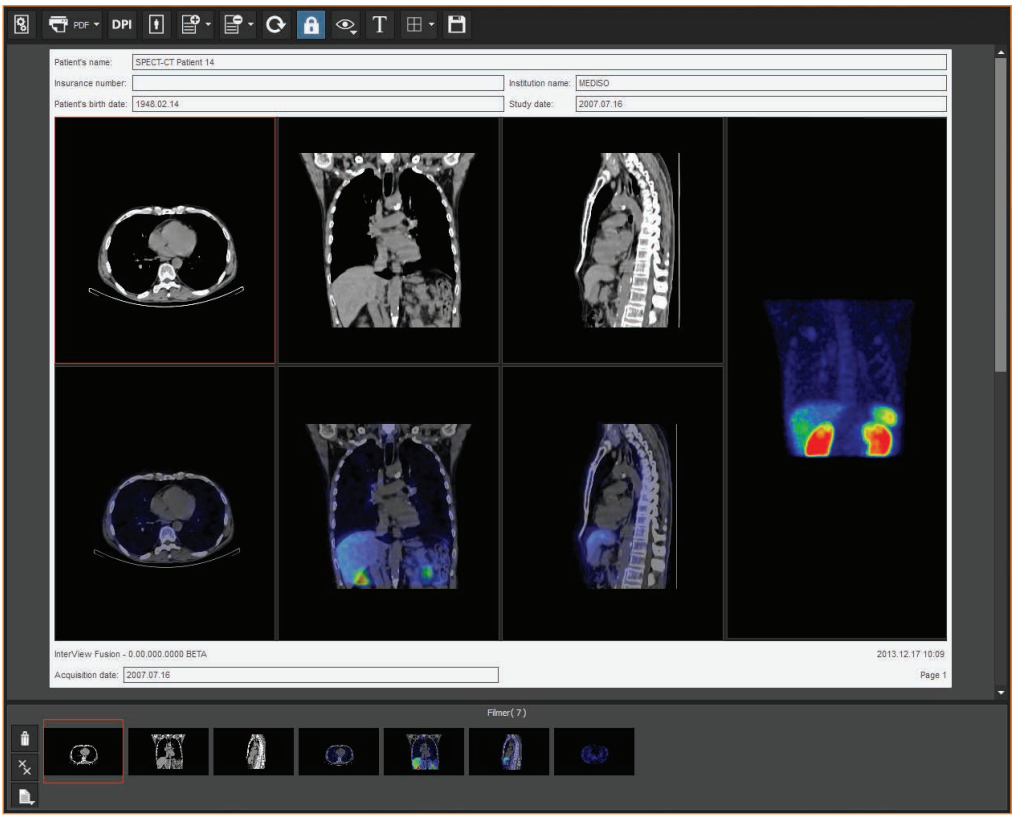
^{18}F-FDG-PET image before and after Gaussian filtering

Live reporting

InterView™ FUSION has a built in live reporting system which provides all viewer interactions in real-time. After capturing an interesting view, you are free to further modify it on the report page. A one-click capturing system provides the viewer or even a whole workspace capture. Annotations and labels can be set up on the report page. The layout of the report can be set over multiple pages. Radiation dose reports are automatically collected (if present) and shown on the report page. A comment page with a ROI statistics table can be shown and edited. Report header-footer customization, institution logo importing as well as exporting and printing of your report is provided by **InterView**™ FUSION**.**

Features

- Live reporting: every manipulation, which can be done in **InterView**™ FUSION, can be done on the report page as well
- Optional comment page: to add comments and represent ROI table
- Optional radiation dose report page: recognized and placed to report automatically upon opening studies
- Header/footer settings (institution, patent, etc. data) can be defined by users
- Print via standard Postscript or DICOM printer
- Export report pages to DICOM SC, PDF, BMP, JPEG, PNG, etc.



Live reporting window where all viewer interactions are provided after capturing a view

Import / export / publish to disc

Import – from RAW to DICOM

- DICOM: Files can be accessed from local and network DICOM servers, PACS, local and network files and folders.
- Supported image types: Computed Tomography (CT), Magnetic Resonance (MR), Positron Emission Tomography (PET), Nuclear Medicine and SPECT (NM), Radiotherapy Structure Set (RTSTUCT), Secondary Capture (SC), Computed Radiography (CR), Digital X-Ray (DX), X-Ray Angiography (XA) and Electrocardiogram (ECG).
- RAW data: Additional information (image and patient) can be given upon loading. In case of PET, necessary information for SUV measurements can be given as well.
- Analyze 7.5TM: Additional information (image and patient) can be given upon loading. In case of PET, necessary information for SUV measurements can be given as well.

Export - whatever and wherever you wish

- The available types are: SC (Secondary Capture), RTSTRUCT (Radiotherapy Structure Set), DICOM (CT/MR/PT/NM), Analyze 7.5, RAW, AVI, PNG, JPEG, BMP, 3D TV BMP, 3D TV PNG, and 3D ALIOSCOPY BMP.
- Export to 3D TV operating with passive glasses.
- Export location may be a local or a network DICOM server, or may be a local or network storage.
- Saving a viewer or whole workspace.
- When exporting several SC, PNG, JPEG or BMP files there are options to normalize and merge slices with a specified slice difference.
- In case of AVI exporting there are several options to set up the quality of the saved file.
- Palettes are also exported in case of still image and AVI-export.
- Oblique bounding box export with adjustable slice thickness, merge mode (MIP, MinIP, Average), number of slices and gap to secondary capture or DICOM images.
- Export report pages.

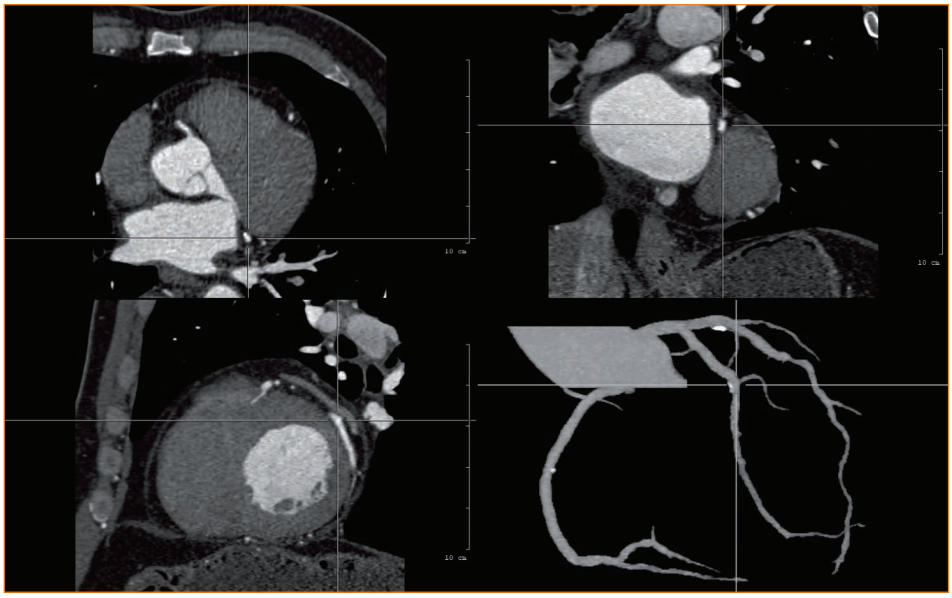
Disc burning

- In-built CD/DVD burning capabilities
- Lite version of **InterView™** FUSION may also be included on the disc providing basic fusion capabilities
- DICOM can be written to CD/DVD as anonymized data
- Disc burning is done in the background

CT tools

Coronary tree segmentation

- Automated coronary tree and plaque segmentation from contrast-enhanced CT [8]
- Can be fused with any images



Synchronized views of the original CT and the coronary segmentation result

Calcium scoring

- Heart segment definition for all plaques
- Agatston, volume and mass score for all plaques, heart segments and the patient (total score)

Couch removal

No external couch database is needed, the algorithm derives the couch information from all individual CT images automatically [9].

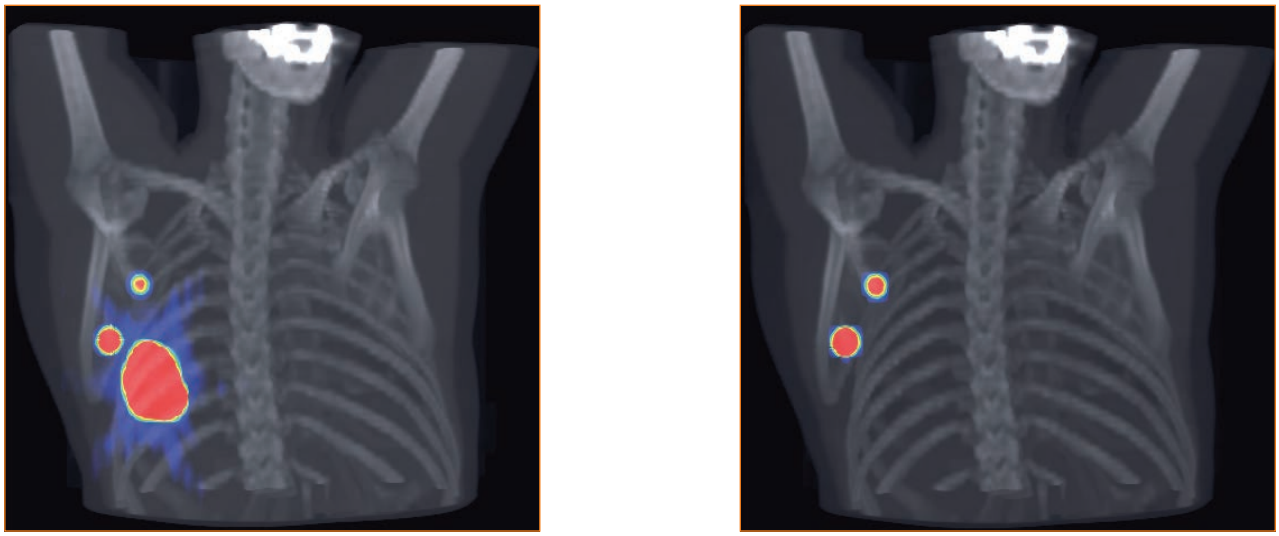
Original image (left), result of automatic patient couch removal algorithm on CT images (right)

- 8: N. Zsoter, P. Bandi, L. Papp, et al: Automated coronary tree extraction and calcification detection from contrast-enhanced CT. Submitted.
- 9: P. Bandi, N. Zsoter, L. Seres, et al: Automated patient couch removal algorithm on CT images, 33rd Annual International Conference of the IEEE EMBS Boston, Massachusetts USA, August 30 - September 3, 2011, pp. 7783 - 7786.

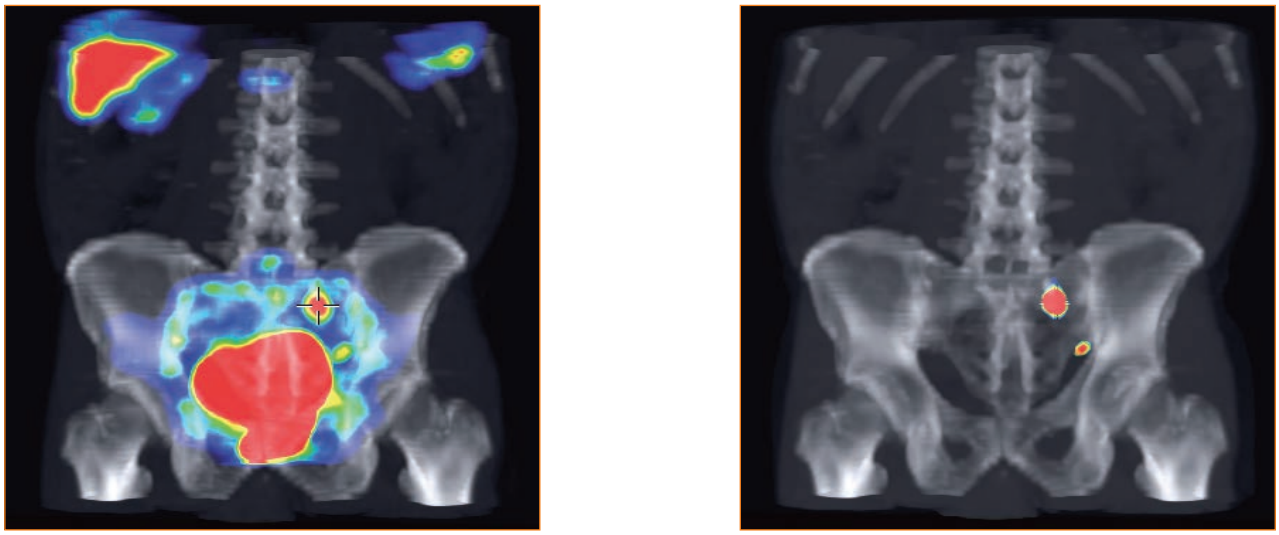
SPECT-CT tools

Lymph node segmentation – detect lymph nodes in 2 minutes

Based on the collaboration with UK-SH Campus Kiel, Germany, our lymph node detection method provides a fast and easy way to quickly detect lymph nodes on SPECT-CT images. The method operates with both SPECT and CT images, where hotspots are detected in SPECT and tissue information is derived from CT. Based on the hotspots, their classification is performed by CT tissue information and further local region based statistical values [10] [11] [12]. The whole method takes 2 minutes in average to detect lymph nodes in SPECT-CT images.



Left: Breast ^{99m}Tc-nanocolloid SPECT-CT image. Right: result of the automated lymph node detection method

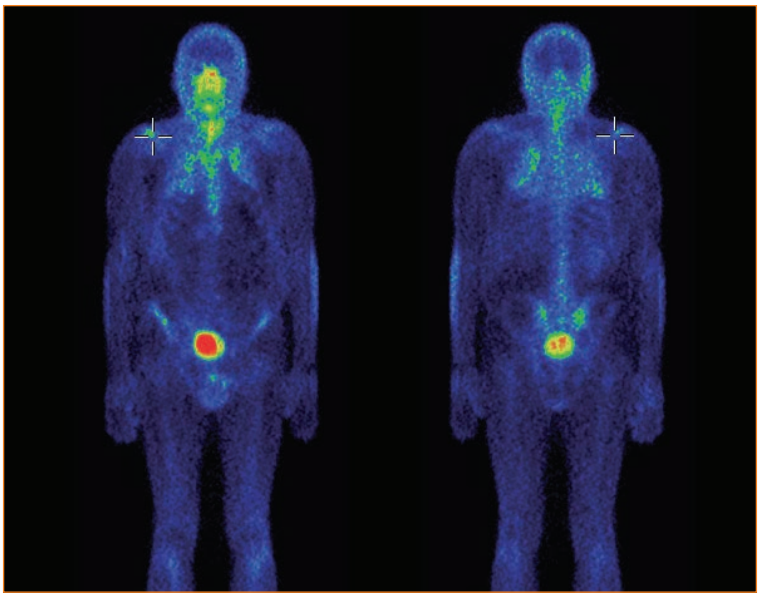


Left: Prostate ^{99m}Tc-nanocolloid SPECT-CT image. Right: result of the automated lymph node detection method

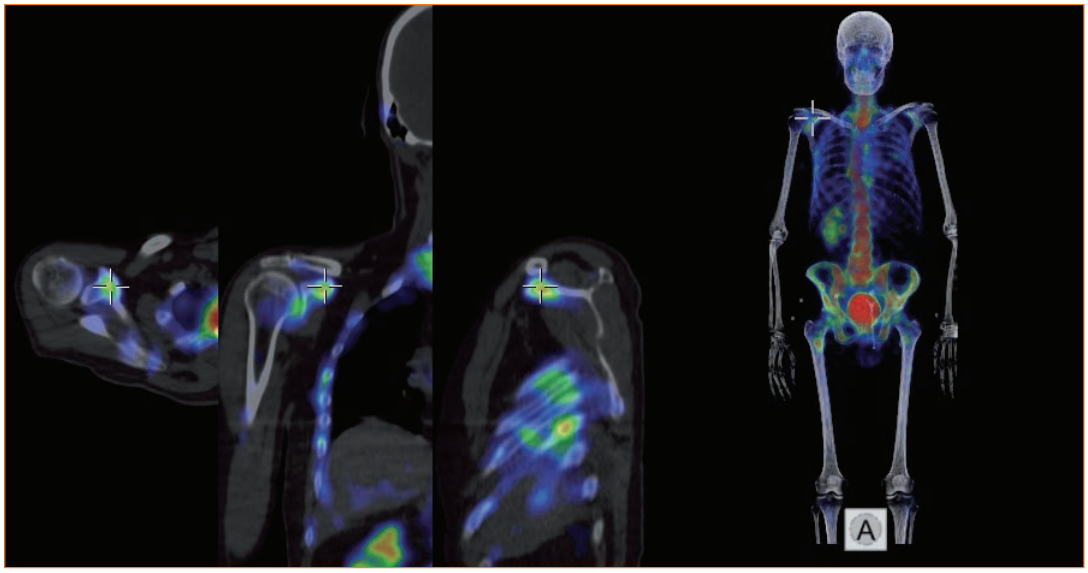
- 10: Automated sentinel lymph node detection and quantification of SPECT/CT images. EANM 2009, Barcelona, Spain, European Journal of Nuclear Medicine and Molecular Imaging Volume 36, Supplement 2, 234-259, DOI: 10.1007/s00259-009-1236-4
- 11: U. Luetzen, N. Zsoter, E. Bernhard, et al: Fully automated sentinel-lymph-node detection software for breast- and prostate-cancer patients using SPECT/CT-studies. European Journal of Nuclear Medicine and Molecular Imaging Volume 37, Supplement 2, 198-311, DOI: 10.1007/s00259-010-1557-3, EANM 2010, Vienna, Austria
- 12: L. Papp, N. Zsoter, C. Loh, et al: Automated lymph node detection and classification on breast and prostate cancer SPECT-CT images. Conf Proc IEEE Eng Med Biol Soc. 2011, IEEE, pp. 3431 - 3434

WB SPECT-CT: new principles in bone imaging

We propose a novel approach, which does not require anterior and posterior planar image pair acquisitions at all [13][14]. Instead we acquire a fast multi-FOV whole body SPECT-CT and derive artificial anterior-posterior image pairs from it. The novelty in our method is the presence of a new SPECT projection stitching algorithm which reduces stitching artifacts to a minimum. Our **Tera-Tomo™ 3D SPECT** reconstruction engine provides excellent results even on our fast scans. Once the whole body SPECT reconstruction is done, artificial planar anterior and posterior images are derived from it to provide aid for localization during evaluation. Attenuation correction is performed during the reconstruction and the artificial planar image generation as well. With this approach a whole body SPECT-CT takes 16-20 minutes in average without the need of planar scans.



Artificial planar anterior and posterior images generated from whole body SPECT-CT



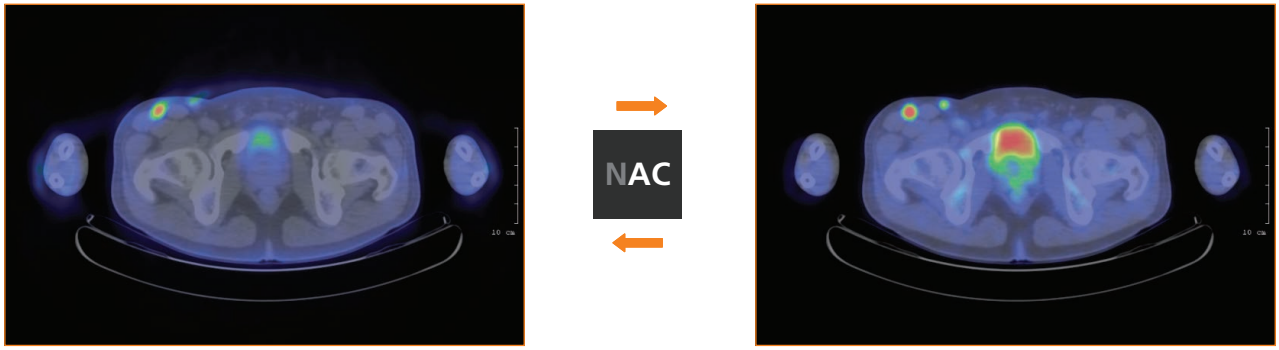
*Whole-body SPECT-CT generated by Mediso's SPECT stistching technique and **Tera-Tomo™ 3D SPECT** reconstruction*

- 13: New workflows and algorithms of bone scintigraphy based on SPECT-CT 34th Annual International Conference of the IEEE EMBS San Diego, California USA, 28 August - 1 September, 2012, pp. 5971 - 5974
- 14: U. Luetzen, P. Bandi, M. Marlies, et al: Clinical usefulness of alternative whole body SPECT/CT workflows for bone scans, EANM 2012

PET and PET-CT tools

AC/NAC quick change

One-button solution to exchange the AC and NAC PET images in the fusion of corresponding CT in real-time.



NAC PET/CT

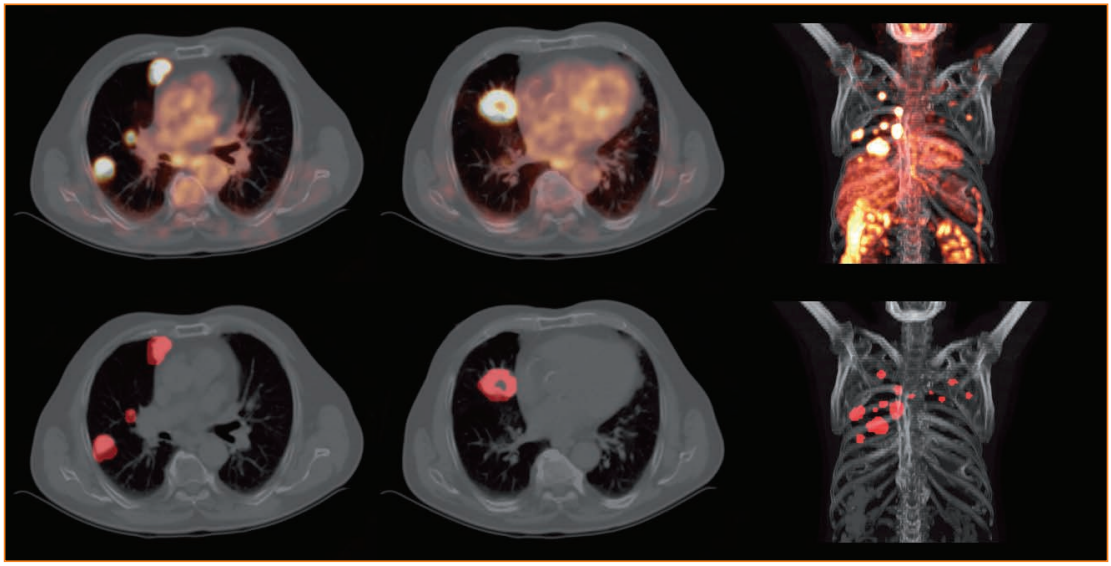
AC PET/CT

SUV modes

Quick modification of available SUV modes: Body weight SUV, Body-surface area SUV, Lean body mass SUV, Original PET value (BQML)

PET and PET-CT lesion detection

Based on a scientific research performed with three German universities, our PET delineation tool represents a state-of-the -art approach of PET hotspot detection and segmentation [15][16]. The tool performs automated hotspot segmentation and classifies them, based on CT data without user interactions. Quick review and modification of the segmented hotspots is provided. Once the results are approved, VOIs and their corresponding SUV statistical values as well as TLG are calculated automatically. The segmentation method takes 2-3 minutes in average on a whole body PET-CT study.



Top row: Original PET/CT before segmentation. Bottom row: PET lesion segmentation

- 15: N. Zsoter, P. Bandi, G. Szabo, et al: PET-CT based automated lung nodule detection 34th Annual International Conference of the IEEE EMBS San Diego, California USA, 28 August - 1 September, 2012, pp. 4973 - 4977
- 16: J. Dinges, L. Papp, N. Zsoter, et al: Novel semi-automatic algorithm for evaluation of total tumor volume and total lesion glycolysis in patients with neuroendocrine tumors, EANM 2012

Labor in cloud

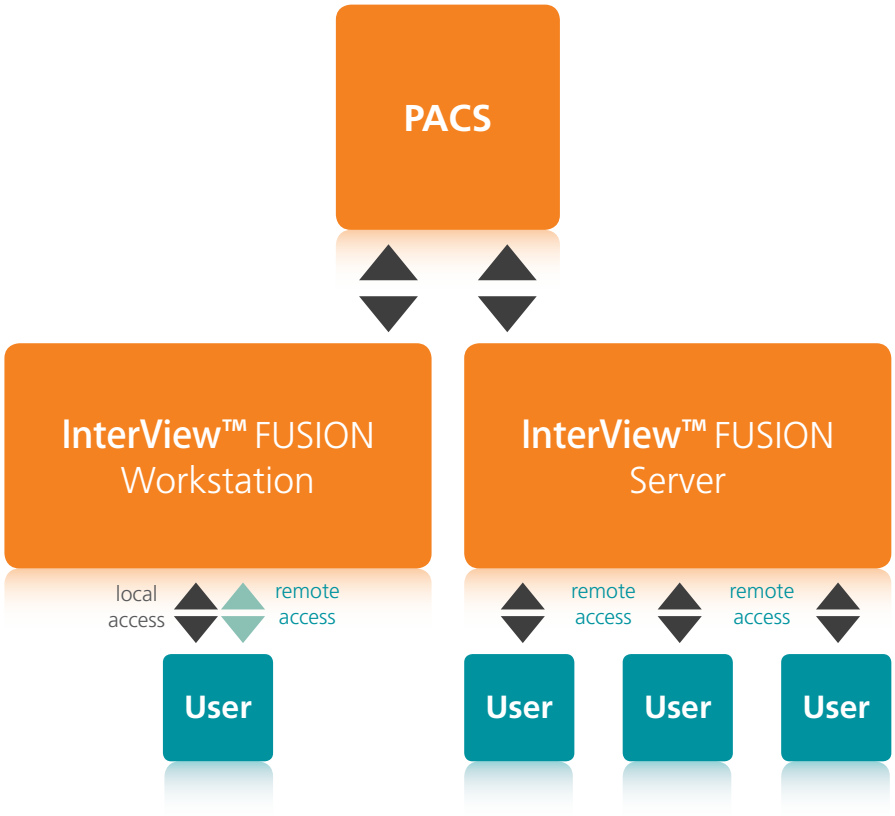
To provide you the best configuration for your research environment, **InterView™** FUSION has now a standalone workstation and a **client-server** variant, both available on **Windows** and **Linux** distributions. The **InterView™** FUSION Server can be accessed from **Windows**, **Linux** and even from the latest **Android** tablets.

InterView™ FUSION Workstation

- Can be accessed locally on **Windows** and **Linux** OS
- Can be accessed remotely by one client at a time (**Windows**, **Linux**, **Android** tablet with keyboard docking station)

InterView™ FUSION server

- **Linux** and **Windows** variants available
- Can be accessed remotely by multiple clients (**Windows**, **Linux**, **Android** tablet having keyboard docking station)



*Single and client-server architecture of **InterView™** FUSION*

Workstation

optional 55″ UHD 3D TV

In order to give as much detail for the study visualizations and evaluation processes as it is possible, **InterView™** FUSION workspace is delivered with extra large 27″+ 27″ (optional) dual monitors. During the evaluation the image processing and the report generation can be done in paralell. The ultra-HD resolution 3D TV provides stunning presentations in real time.

monitor: 27″ + optional 27″

InterView™ FUSION Ultimate Processing Workstation

- Intel® Core™ i7 3.4 GHz 6-core processor
- 32 GB RAM
- 12 TB hard disk drive with RAID for safe archiving
- Multi-GPU engine for fast image processing & post-reconstruction
- CD-DVD-RW drive
- Keyboard, mouse
- Full DICOM 3.0 compatibility (send/receive, print, query/retrieve)
- Dual 27″ high resolution (2560x1440) LCD monitor
- Integrated Gigabit Ethernet controller
- Windows 7 64 bit Ultimate operating system (multiuser/multitasking)

InterView™ FUSION Processing Workstation

- Intel® Core™ i7 3.0 GHz multi-core processor
- 16 GB RAM
- 6 TB hard disk drive
- CD-DVD-RW drive
- Keyboard, mouse
- Full DICOM 3.0 compatibility (send/ receive, print, query/retrieve)
- 27″ high resolution (2560x1440) LCD monitor (optional second 27″ monitor)
- Integrated Gigabit Ethernet controller
- Windows 7 64 bit Ultimate operating system (multiuser/multitasking)

References

1: PCT/HU2012/000066
2: Gábor Jakab, Tamás Huszár, Balázs Csébfalvi: Iterative CT Reconstruction on the GPU. In: VI. GRAFGEO Conference. Budapest, Hungary, 02.21. 2012-02.22. 2012. pp. 124-131.
3: Gábor Jakab, Attila Rácz, Tamás Bükki, Gábor Németh: Fully GPU Based Real Time Corrections and Reconstruction for Cone Beam Micro CT. In: IEEE - High Performance Medical Imaging (HPMI): Science Symposium Conference Record (NSS/MIC). Orlando, USA, 2009.10.24-2009.11.01. Orlando: IEEE, pp. 4068-4071.
4: Gabor Jakab, Laszlo Szirmay-Kalos: Hybrid Monte Carlo CT Simulation on GPU. In: Lecture Notes of Computer Science (LSSC'13), 2013.

Conformance Statement

Quality management system operated by Mediso Medical Imaging Systems complies with Council Directive 93/42/EEC Annex II. The multimodality molecular imaging system was approved by a Notified Body.

Product design, development, production and services comply with EN ISO 13485 and EN ISO 14971. Medical device design and safety testing has been performed in accordance with EN IEC 60601-1 and EN IEC 60601-1-2 standards.

Safety labels are attached to appropriate places on equipment and appear in all operation manuals.

The supplied software complies with DICOM standard.

The technical information provided here is not a detailed specification.

For details and up to date information please contact your local distributor or Mediso Medical Imaging Systems.
*Notified under No. 1008 to the EC Commission.

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