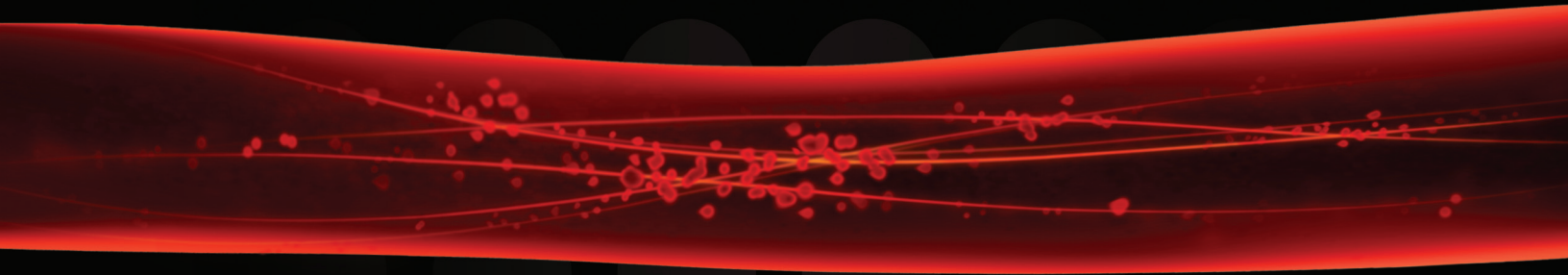




mim
MAESTRO
unlimited[™]

Radiation Oncology Department Solution



Why MIM?

Leading radiation oncology centers around the world are switching to MIM to maximize efficiency and take advantage of cutting-edge tools throughout their entire departments.

Whether it's to unify a multi-vendor environment or fill the holes left by a single treatment planning system, these departments are experiencing the benefits of a best in class, vendor-neutral solution.

Having access to MIM Maestro throughout your department will allow you to realize the full benefits of recent advancements in treatment delivery, evaluation, and adaptation – all without increasing your workload.

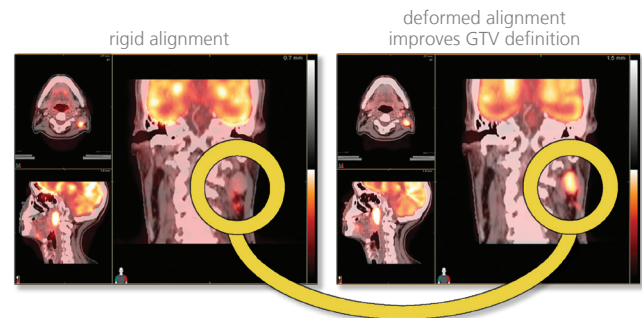
"We love MIM and wouldn't know what to do without it at this point. Contour CoPilot has made my life easier. It anticipates what I want to draw from slice to slice and cuts down on our physician workload. MIMcloud has made it possible for us to share our planning workload between centers located hours away."

Jim Clarke, M.D.
Radiation Oncologist
Gamma West Cancer Services
St. George, Utah

GTV Contouring

Accurate target volume definition often requires the integration of multi-modality images.

MIM Software Inc., which began as an image fusion company almost a decade ago, has developed unparalleled tools for the integration of diagnostic images into treatment plans. With *Assisted Alignment*, our mutual information rigid alignment algorithm, MIM generates accurate fusions, typically in fewer than ten seconds. Multiple modalities can be fused simultaneously, and contours can be edited dynamically from any plane and on any modality – whatever image best visualizes the tumor.



Integrating PET/CT into treatment plans presents a series of challenges. Scans are typically done in a non-treatment position and on a curved couch. Additionally, defining a PET GTV can be difficult due to the subjective nature of visual delineation and the many limitations of the common SUV threshold tools. MIM provides tools to address these problems resulting in greater confidence for incorporating PET/CT into treatment plans.

The *VoxAlign Deformation Engine* accurately registers PET/CT images to simulation CTs by correcting for changes in positioning. *PET Edge*, MIM's gradient-based segmentation technique, accurately defines PET positive GTVs, helping to take the guesswork out of PET contouring.

Diagnostic Quality

Our entrance into radiation oncology was an organic one. Since the founding of our company nearly a decade ago, our software has been used in leading radiation oncology centers for performing fusions. Over time, we developed a product specifically for radiation oncology based on requests from users like you.

MIM Maestro provides radiation oncologists with the very same industry-leading tools in routine use in thousands of radiology and nuclear medicine departments worldwide. This means you have access to the most powerful image display, manipulation, and comparison software available. Our unique platform has dramatically increased the confidence of radiation oncologists in using diagnostic images in treatment planning decisions.

Auto-Contouring

MIM Software Inc. has consistently led the industry with auto-contouring tools for the past several years.

MIM Maestro was one of the first commercial software solutions with atlas-based segmentation. And with user-defined atlas libraries, automatic atlas subject selection, and the *VoxAlign* algorithm, it's still the best solution on the market.

Contour CoPilot (patent pending) is the latest milestone in our history of innovation, providing an auto-contouring solution for both CT and MR. Instead of pre-contouring an entire structure that you must then adjust slice by slice, *Contour CoPilot* fits right into the editing workflow, where it saves you time along the way and learns from your edits.

Experience the fastest way to contour on any plane, on any modality, and with any contour.

"The Contour CoPilot tool is amazing. I love using the CoPilot to rapidly create contours. We are building new standardized multi-site contouring atlases, and we are using the CoPilot instead of other segmentation tools. Compared to other various options, the CoPilot saves a lot more time and has superior ergonomic properties."

George Rodrigues, M.D., FRCPC, M.Sc.
Radiation Oncologist
University of Western Ontario
London, Ontario

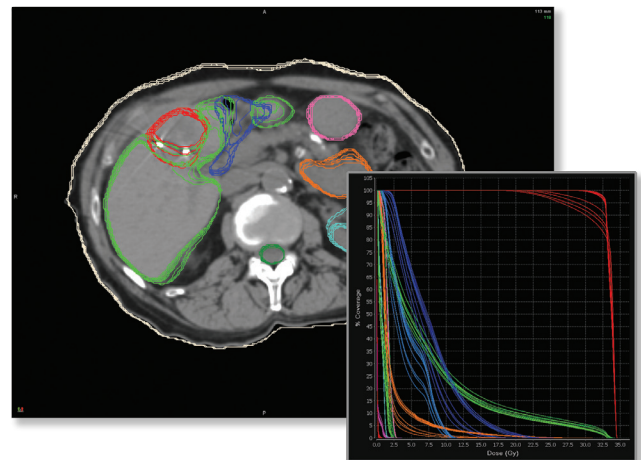
4D CT

4D CT contains much more information than most centers are able to take advantage of due to time constraints and limited functionality in other software. MIM unlocks the full benefit that 4D CT imaging offers.

In addition to contouring and dose review on the 4D cine and MIP images, MIM also allows you to contour a single phase and use the *VoxAlign Deformation Engine* to automatically propagate the contours to all the other phases.

Deformable propagation of an entire structure set takes just a few minutes and generates an ITV for planning and an entire structure set for 4D DVH evaluation. You can generate a DVH for each phase to help determine if gated treatment is necessary, or even perform 4D dose accumulation to better evaluate the overall dose delivered.

With these advanced tools, RT-PACS archival, and compressed transfer, MIM will help you get the most out of your 4D CTs with little more effort than a traditional 3D simulation.



Contour CoPilot

In 2008, when we introduced atlas-based segmentation and adaptive re-contouring into the clinical setting, MIM became a pioneer in 3D auto-contouring.

Even a few years later, these and other auto-contouring tools are still enormous timesavers. But ultimately, every automatically generated contour is reviewed and, if needed, edited slice by slice. Because of this limitation, we recognized the need for an alternate method to generate contours quickly, regardless of anatomy, on both CT and MR. To meet this need, we designed a tool which is revolutionizing manual contouring – *Contour CoPilot*.

Contour CoPilot uses our flexible and accurate *VoxAlign Deformation Engine* to “learn from” the work you’ve done on a contour slice and propagate that contour to the next slice, using the underlying images to find and adjust to the differences in the volume. *Contour CoPilot* uses the slice you just contoured to auto-contour the slice you were going to review and edit next – seamlessly fitting into your existing contouring workflow.



Adaptive Therapy

Deciding when to replan a patient can be a challenge without sophisticated quantitative tools.

Using MIM, contours can be automatically deformed from a planning CT to a CBCT. Then DVH and isodose curves can be compared against the original treatment plan, or even summed for an overall picture of delivered dose. Then, when replanning is required, documentation to justify the planning decision is readily available.

Many institutions have experienced an immediate increase – three times or more – in the number of patients undergoing adaptive replanning as a direct result of implementing MIM into their workflow.

Quite simply, by removing the bottleneck of contouring mid-treatment CTs, physicians feel much more equipped to provide this valuable correction step to patients. Typically, auto-contours are ready in about a minute and only take a few minutes to review and edit.

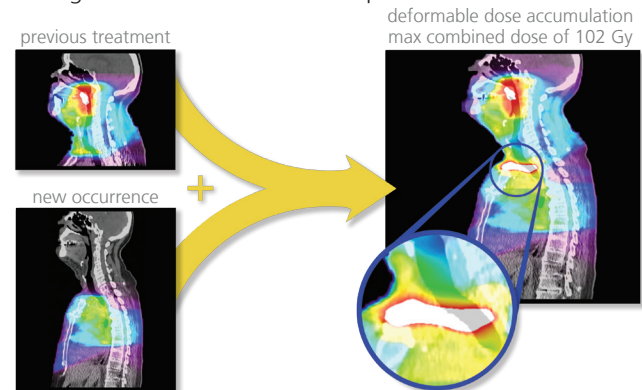
“MIM has made adaptive replanning of head and neck IMRT cases a feasible standard operating procedure in our department. MIM has decreased physician turnaround of approved volumes by a significant amount.”

Amy Harrison
Medical Physicist/Clinical Supervisor
Thomas Jefferson University Hospital
Philadelphia, Pennsylvania

Dose Evaluation

With unlimited access to MIM throughout your department, you can review and compare plans from your office, home, or even patient consult rooms and tumor boards.

If a patient has received radiation previously, MIM can quickly sum as many dose volumes as required, giving a clearer picture of the overall dose the patient will receive. Even multi-modality treatments, such as SRS or brachytherapy and EBRT, can be combined after conversion into biologically effective dose. A dose volume deformed using the *VoxAlign Deformation Engine* can be sent to the planning system as a baseline dose for optimization, or isodose curves can be turned into contours to be used as tuning structures to reduce hot spots.



Correlating delivered dose with post-treatment response assessment images can be critical for patient management. Without MIM, it can be extremely difficult or even impossible to determine how disease seen on a PET/CT or MR taken months after treatment relates to the treatment the patient received. With MIM, this evaluation can be done with remarkable accuracy and ease.

VoxAlign Deformation Engine

The *VoxAlign Deformation Engine*, introduced in 2007, includes the first commercially available deformable registration algorithm tuned for CT-CT registration. Even today, most other systems use general-purpose deformable registration algorithms, similar to those that are available with open source toolkits like ITK. By focusing specifically on CT to CT registration, we were able to develop an algorithm which harnesses more information from the images to guide the registration to a more accurate result.

Our algorithm is a constrained, intensity-based, free-form deformable registration. Our implementation uses the entire contrast window of the CT for matching the two scans, instead of a mutual information approach which compresses the contrast in the CT, and leaves less information to guide tissue matching. Additionally, our algorithm employs millions of degrees of freedom for the registration, allowing it to accurately capture very local deformations in addition to global changes. Finally, the algorithm is constrained in an attempt to minimize unexpected deformations in the final result, such as bone deformation or registrations which aren't smooth or tear tissue.

While most algorithms with this level of accuracy would require hours to execute, our implementation typically takes under a minute.

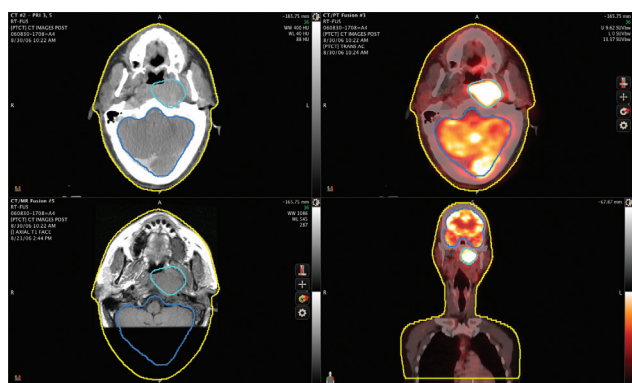
VoxAlign



Vendor Neutrality

With MIM as the hub and front end for the entire department workflow, physicians only need to learn one software program for many of their tasks.

Contouring, fusion, dose review, and much more can be done in MIM regardless of the treatment planning and other systems you use. From radiology PACS to outside CDs to treatment planning systems, MIM integrates seamlessly with all the systems in your workflow.



Most treatment planning systems currently support DICOM RT structure import and RTplan and RTdose output. As a result, you can use MIM's best in class tools to store, visualize, and manipulate this rapidly increasing amount of data – no matter where it's coming from or needs to go. There is no need to recommit old linacs with new software. Just export all your DICOM data to MIM knowing that no matter how you upgrade your systems, your data will be ready when you need it.

Data Management

The MIM Maestro Unlimited Department Solution is designed to get data to where it needs to be, when it needs to be there.

MIMPacs RT, included in the Department Solution, provides tools such as automatic querying for diagnostic images, automatic syncing to MIMcloud, and compressed data transfer to ensure fast access to the data you need.

No longer are you restricted to working on one patient at a time. With multiple sessions, you can preload one patient to review with a colleague while you work on another. Also, multiple people can contour the same patient at the same time and simply merge their results when finished.

With MIM, the treatment planning system is no longer a bottleneck. The TPS can be used for what it's best at – plan optimization and dose calculation – while MIM handles the rest.

PET Edge

In response to the many difficulties with PET segmentation when using visual delineation or SUV threshold tools, we developed *PET Edge*, an innovative gradient-based segmentation method.

Visual tumor delineation is limited by the user's selected image contrast and level of expertise with PET, as well as variability between users. SUV threshold tools are subject to a number of limiting factors, including the tumor uptake relative to the background, heterogeneous uptake within the tumor (e.g., areas of necrosis), tumor size, and partial volume effects. *PET Edge* avoids all of these pitfalls by robustly identifying the boundary between tumor and background using the maximum change in SUV value.

PET Edge has been shown to outperform SUV threshold tools across multiple PET cameras, reconstruction methods, tumor sizes, and levels of background activity. Using realistic digital PET phantoms with lung tumors of varying size, shape, and location, *PET Edge* was found to be more accurate and consistent between users than both visual tumor delineation and SUV thresholds. Recent pathology studies have also demonstrated the superior accuracy of *PET Edge* over SUV thresholds.

PET Edge is **the** tool radiation oncologists have been waiting for to truly experience the full value of functional imaging in their treatment plans.



Long-term Storage

MIMcloud provides a hassle-free, secure, and surprisingly economical solution for long-term storage of your patient data.

Since MIM is committed to IHE-RO conformance, you can rest assured that your DICOM RT objects and other data will be easily accessible for as long as you need.

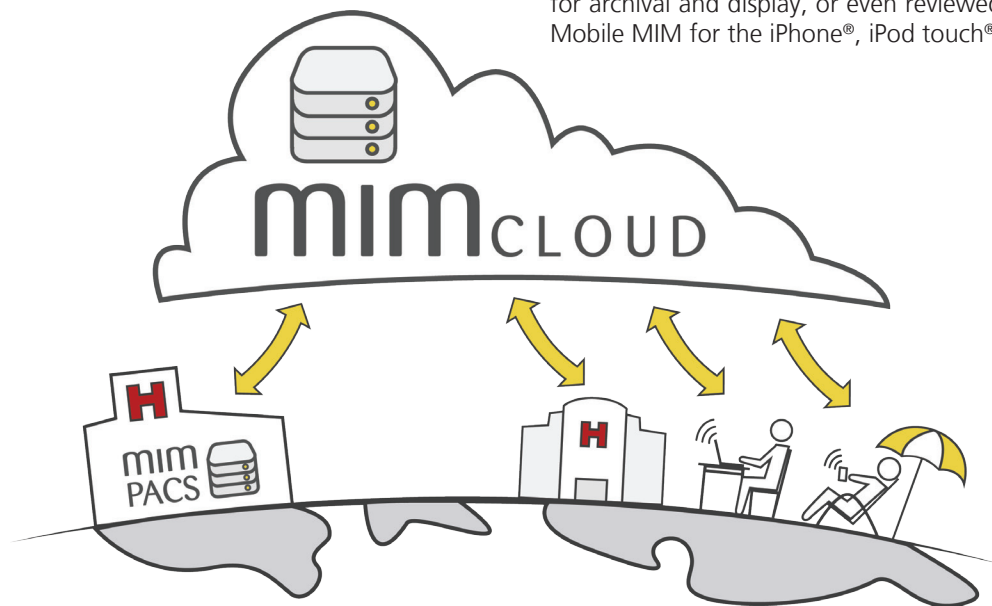
MIMpacs RT ensures that your data is available locally and quickly. You can also configure it as a long-term local archival solution and use MIMcloud as the off-site backup. Remote backup of your patient data is essential in case of a catastrophe, and MIMcloud is the easiest way to protect your data.

Remote Access

An unlimited number of MIM Maestro licenses combined with MIMcloud means that you can access your patients' plans from anywhere in the world – and fast.

You can contour and review plans using the same state-of-the-art tools, whether you're at a dedicated workstation in your department or away from the office. With compressed transfers and the MIM Maestro thick client, you don't have to configure a VPN or worry about a slow Internet connection hindering performance.

Sharing data with referring physicians, tumor boards, and patients is surprisingly easy. Data can be shared with other MIMcloud accounts, burned to a MIMviewer CD for archival and display, or even reviewed on the go with Mobile MIM for the iPhone®, iPod touch®, and iPad®.



MIMcloud

MIMcloud is a secure, Internet-based medical image service that provides an easily accessible resource for storing, sharing, and viewing.

Archive your DICOM data off-site for as long as you need. MIMcloud provides secure, scalable, and redundant storage via Amazon S3, a distributed global storage mechanism. Compliant with HIPAA standards, MIM encrypts the data with military grade AES 128-bit encryption before sending it to MIMcloud. All data is transferred using SSL encryption and decrypted only when it arrives at an authenticated user's computer.

With MIMcloud, you, your referring physicians, and any other medical professional can access studies from anywhere with Internet access. There are a variety of configurations to simplify sharing among groups and individuals, and only users and accounts you authorize can decrypt data.

MIMcloud integrates seamlessly into MIM Maestro installations as a data source, just like MIMpacs. Alternatively, you can access the data remotely through MIMcloud wherever you have Internet access by launching MIMviewer directly from a web browser or using Mobile MIM for the iPhone, iPod touch, and iPad.



Upgrades & Support

With the MIM Maestro Unlimited Department Solution, you're not just buying a product, you're making an investment. We pride ourselves on our history of innovation and our commitment to providing resources to meet the needs of customers. Many significant enhancements are added as upgrades to our existing products without having to be purchased separately. And with MIM's unparalleled customer support, you have the help you need to keep your department running at peak efficiency.

"A fundamental goal for our company is to provide superior customer service. I never, ever, want to leave a customer unsatisfied. I am always amazed when a customer comes up to me at a show and compliments our customer service; to me, we are just doing what we should do! Our sales people and applications specialists work very closely with our engineers; and together they all work in customer service. All our people know our products of course, but just as important, they know our customers' needs and problems."

Dennis Nelson, Ph.D.
Founder & President
MIM Software Inc.
Cleveland, Ohio

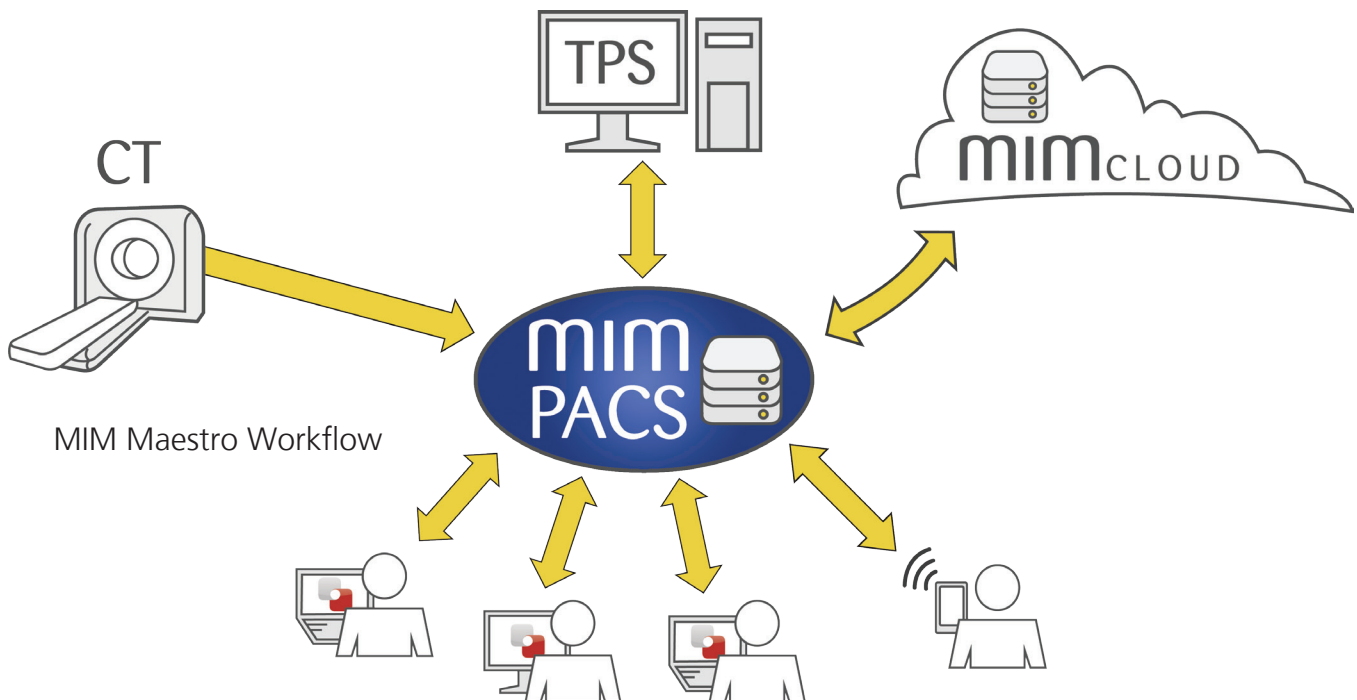
Unlimited Access

As MIM Maestro has evolved, our users have come to prefer it for an increasing amount of their radiation oncology workflow.

When visiting users, we noticed that many sites had calendars for scheduling time on the MIM licenses. The arrival of MIMcloud and remote access to the software increased the use of MIM even more. It became apparent that most of our users would benefit from additional MIM Maestro licenses.

We've responded by creating the MIM Maestro Unlimited Department Solution. Now, no matter where you are or which of your colleagues is using MIM, you'll have access to the tools you need.

The benefits are substantial. Imagine using *Contour CoPilot* on even the simplest of plans. Now, with MIM Maestro Unlimited, you don't need to worry about tying up your licenses.



intuitive and efficient interface

- multi-modality fusion & display (PT, NM, CT, MR, 2D)
- assisted alignment on user-defined local anatomy in ~10 seconds
- intuitive manual alignment
- comprehensive PET review
- multiple display options
- synchronized display of aligned images
- on-screen help
- create subtraction/difference images

radiation oncology

- atlas-based segmentation auto-generates structure sets
- adaptive re-contouring for more efficient replanning
- deformable alignment of PET/CT to planning CT
- 4D deformable contour propagation from one phase to all phases
- deformable dose accumulation aids treatment decisions
- true 3D contouring in all planes

neuro

- probabilistic and single brain anatomical atlases
- quantitative comparisons to a normal database
- automated deformable registration for PET/SPECT
- region, voxel, cluster, and cortical-based analyses
- ictal and interictal SPECT subtractions for epilepsy
- features and analysis in patient space to aid in surgical planning
- fusion of PET/SPECT volumes or subtractions with MR/CT

cardiac

- automatic cardiac segmentation
- automatic calculation of cardiac volumes
- gated PET/SPECT LVEF measurements
- fusion of stress/rest images
- difference images highlight changes in activity

MIMcloud

- access images from anywhere
- web-based viewing solution
- seamless integration with MIM workstation software
- share easily with colleagues or patients
- short-term or long-term remote storage
- HIPAA compliant, secure

enhanced marketing tools

- MIMviewer® DICOM viewer with fusion capabilities
- screen capture utilities
- report generation
- annotation

RT-PACS / networking

- DICOM send/receive & query/retrieve
- RT DICOM Support (Plan, Dose, Beam, etc.)
- send volumes and secondary captures to PACS
- FTP send/receive
- fully integrated multi-modality PACS
- secure networked user login (LDAP integration)
- automatic study routing / retrieval / archival
- per-user configuration

import formats

- 2D DICOM NM, US, CR, DR, CT scout, Secondary Capture
- 3D DICOM PT, NM, CT, MR
- DICOM RTSTRUCT
- JPEG, TIFF, BMP
- ECAT PET

output formats

- DICOM aligned PT, NM, CT, MR
- DICOM RTSTRUCT
- DICOM Secondary Capture
- MIP as DICOM, AVI, MPEG
- JPEG, TIFF, BMP
- DICOM Report
- DICOM Print, Windows Print

system specifications - PC

- Intel® Core i7 (Quad Core)
- 8+ GB 800+ MHz RAM
- 16x CD/DVD +/-RW Drive
- 1 TB Hard Drive
- 512 MB Dual DVI Graphics Card
- One 24" LCD or Two 19" LCD
- Gigabit Ethernet
- Microsoft Windows 7® Professional 64-bit or
- Microsoft Windows Vista® Business 64-bit

system specifications - Mac

- iMac® 27-inch – Intel® Core i7 / Mac® Pro – Intel Quad-Core Xeon
- 8+ GB RAM
- SuperDrive®
- 1 TB Hard Drive
- 512MB ATI or NVIDIA® Graphics Card
- Apple® Display(s)
- Mac OS® X 10.6

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