
RayStation

RayStation

ADVANCING CANCER TREATMENT

SOME OBSESSIONS ARE HEALTHY

Start with an idea for vastly improved treatment planning software. Take some of the world's best developers and clinical specialists. Then innovate ceaselessly for nearly two decades, drawing on insight from world-leading cancer centers. The result is RayStation®* – a treatment planning system with an unmatched user experience and groundbreaking features that extend treatment possibilities.

*Regulatory clearance needed in some markets.

- **Compatibility** with most linear accelerators, OIS and third-party QA
- **Workflow-driven design:** user experience is a key aspect of our product development
- **High speed and accuracy** for easier and more effective planning
- **Robust optimization** for all treatment techniques
- **Real-time evaluation** of clinical trade-offs with multi-criteria optimization
- **Automatic creation of multiple plans** for defined combinations of techniques and machines with Plan Explorer
- **Flexibility** beyond the standard user interface with scripting
- **Support for advanced particle-therapy** techniques, including carbon-ion planning
- **Dedication to supporting cutting-edge** approaches, such as adaptive therapy and automated planning
- **Commitment to partnership:** strong focus on customer training and support and on building scientific collaborations

No one wants to wait for better cancer treatment, and software is a way to accelerate change. Software refinements make it possible to keep pace with new techniques and discoveries in an efficient manner.

Radiation therapy equipment is a significant investment. But all too often, software is an after-thought rather than an integral aspect. Thought-fully designed software is the key to realizing the full potential of equipment and getting the best return on investment.

But RayStation is more than just software. It incor-porates the knowledge and experience of a team of experts dedicated to bringing scientific advance-ments in cancer treatment faster to the clinical world. RaySearch continuously evolves the system, paying as much attention to small enhancements as to major additions. Every development is designed to support you in securing better outcomes and improved access to care.

RayStation makes daily work more efficient and straightforward for any clinic, as well as leading the way in advanced techniques. RaySearch believes that an intelligent combination of adaptive planning and automated planning will create a bright future for radiation therapy. As a RayStation user, you are helping to shape that future.

AUTOMATED PLANNING

- Plan Explorer
- Fallback planning
- Automatic breast planning
- Scripting

ADVANCED OPTIMIZATION TOOLS

- Multi-criteria optimization
- Robust optimization
- Co-optimization of multiple beam sets
- Radiobiological optimization and evaluation

PHOTON AND ELECTRON PLANNING

- 3D-CRT
- IMRT
- VMAT
- TomoTherapy
- Electrons
- MR-based planning

ADAPTIVE PLANNING

- Deformable registration
- Dose tracking
- Adaptive replanning

VIRTUAL SIMULATION

- One-click plan creation with orthogonal beam pair
- Isocenter placement using DRR pair
- Export to patient marking systems

PLAN EVALUATION

- Dose statistics and clinical goal lists
- Plan evaluation tools
- Perturbed dose computation

PROTON PLANNING

- PBS, DS, US, LS, Wobbling
- Monte Carlo dose computation
- 4D robust optimization
- PBS optimization with apertures
- Automatic creation of backup photon plans

PATIENT MODELING

- Manual and semi-automatic organ and target delineation tools
- Rigid image registration and fusion tools
- Model-based segmentation
- Atlas-based segmentation

CARBON-ION PLANNING

- Carbon-ion PBS optimization

TREATMENT PLANNING THE WAY IT SHOULD BE

RayStation has been designed with your needs and workflow clearly in mind. The intuitive interface makes it a joy to use, however complex the workflow. With ultrafast computation speed and groundbreaking features such as multi-criteria optimization and 4D adaptive radiation therapy, RayStation will revolutionize your planning process.

ONE SYSTEM. ENDLESS POSSIBILITIES.

RayStation optimizes for all treatment techniques, with robust algorithms that account for density and patient setup uncertainties. RayStation's ultrafast multi-purpose optimization engine can solve virtually any optimization problem within radiation therapy, using many degrees of freedom of the treatment unit.

> *The system is fast and easy to use and gives us the possibility to create high quality IMRT plans. Our driver is to provide high quality, robust treatment plans. This is dependent on an efficient workflow. To use time in a smart way, we have to automate things that can be automated. By employing software to perform standard operations, our specialists can focus on more creative tasks."*
>
> – Rik Westendorp, Medical Physicist, RISO Radiotherapeutic Institute, Deventer, Netherlands

3D-CRT

Fast and consistent conventional 3D-CRT treatment planning with manual and automatic tools for conformal treatment using treat-and-protect, beam weighting, wedges, etc. Modern inverse planning techniques are provided for creating conventional 3D-CRT plans, which can be automatically optimized in regard to any combination of segment shapes, segment monitor units, collimator, gantry and couch angles.

IMRT

State-of-the-art tools make it simple to design and optimize IMRT treatment plans. Direct optimization of step-and-shoot segments ensures high-quality plans with a minimum number of segments, speeding up the planning and delivery processes. Conversion for Sliding Window (dynamic MLC) IMRT is also supported.

TOMOTHERAPY PLANNING

RayStation supports planning of TomoTherapy treatments. With access to all RayStation's advanced functionality, including multi-criteria optimization and adaptive planning, the user can efficiently design the optimal treatment plan. Optimization capabilities for the TomoTherapy machine include dynamic jaw support, delivery time constraints and the possibility to specify "protect" regions where irradiation is avoided. TomoTherapy planning can be smoothly integrated into the clinical workflow and treatment plans are sent to Accuray's integrated data management system for delivery (IDMS 1.1 or later is required).

MR-BASED PLANNING

An MR image can be used as the planning image for photon therapy. MR images provide superior soft-tissue contrast compared to CT images, which enables better characterization of soft tissue and improved delineation of tumors and organs at risk. Planning is based on a user-defined bulk density assignment approach, which can be founded on atlas-based segmentation.

VMAT

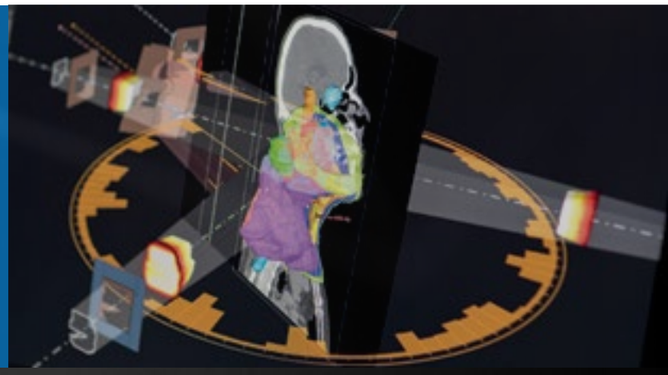
Design and optimization of single- or multiple-arc VMAT plans through an optimization procedure (inverse planning). Objectives and constraints are defined for the desired dose, and the system creates a plan that matches these criteria as closely as possible within the limitations of the treatment machine. The optimized plan is directly deliverable, without the need for post-processing that might degrade quality.

ELECTRONS

Creation of mixed electron and photon plans is enabled, with multiple coupled or independent beam sets applied in a single treatment plan. 3D visualization of the treatment setup makes it possible to inspect the physical perimeter of the selected applicator in relation to the patient geometry, which assists in collision avoidance. The electron module supports automatic generation of the cutout shape, using the same treat-and-protect tools as the 3D-CRT module. The cutout can also be created and edited using a manual brush tool.

CO-OPTIMIZATION OF MULTIPLE BEAM SETS

Two beam sets in a plan can be optimized simultaneously, and co-optimized beam sets share an objective function list. Objective functions can be assigned to each beam-set dose, or to their sum. This feature enables efficient planning of non-integrated boost treatments. SMLC, DMLC and VMAT are supported.



EVALUATE CLINICAL TRADE-OFFS IN REAL TIME

RayStation's multi-criteria optimization makes it faster and simpler to achieve the best available balance in prioritizing healthy tissue to spare.

MULTI-CRITERIA OPTIMIZATION

Clinical trade-offs are a constant issue in radiation therapy treatment planning. The conventional approach to resolving them is based on time-consuming trial and error, where an optimization problem is manually formulated and the treatment plan is re-optimized multiple times. Even if a satisfactory treatment plan is arrived at, there is always the possibility that better treatment alternatives have been overlooked.

RayStation's multi-criteria optimization tool gives a new level of confidence, quickly generating a set of relevant treatment plans that are Pareto-optimal regarding user-specified priorities, objectives and constraints. The planner or physician can fine-tune a plan by moving sliders in real time to balance between conflicting clinical goals.

Supported photon delivery techniques include SMLC, DMLC, VMAT and TomoTherapy. For proton therapy, PBS is supported.

CLINICAL BENEFITS:

- Planners and physicians can find solutions they didn't know existed
- Plans have been shown to yield significant improvements in organ-at-risk sparing *
- Treatment planning time is significantly reduced without compromising plan quality
- Planners with limited experience can produce clinically acceptable plans

*Multi-criteria optimization achieves superior normal tissue sparing in a planning study of intensity-modulated radiation therapy for RTOG 1308-eligible non-small cell lung cancer patients. Kamran S, et. al. Radiotherapy & Oncology, March 2016, Volume 118, Issue 3, pp 515–520.

"The typical trade-off in radiation treatment planning is target coverage versus critical structure sparing. Traditional treatment planning proceeds in a trial and error fashion, where the planner tries to guess at system optimization parameters that might strike the best balance amongst the multiple conflicting goals. But this process can be quite time consuming.

Multi-criteria optimization simplifies this by presenting the planner with a set of sliders which allow them to surf across the trade-off space and quickly decide on the right balance."

– David Craft, Assistant Professor, Department of Radiation Oncology, Massachusetts General Hospital, Boston

MORE PLANS. LESS PLANNING…

RaySearch believes that automating key parts of the treatment planning process makes a significant contribution to improving patient outcomes and access to care. We automate standard procedures so that you can spend your valuable time on complex cases and provide more personalized care to the patients who need it most.

PLAN EXPLORER

Plan Explorer brings a completely new perspective to treatment planning and radically changes the planning process. It automatically generates a large number of plans for defined clinical goals and combinations of treatment techniques and machines. It also provides an efficient way to filter and browse among plan candidates to evaluate the best option.

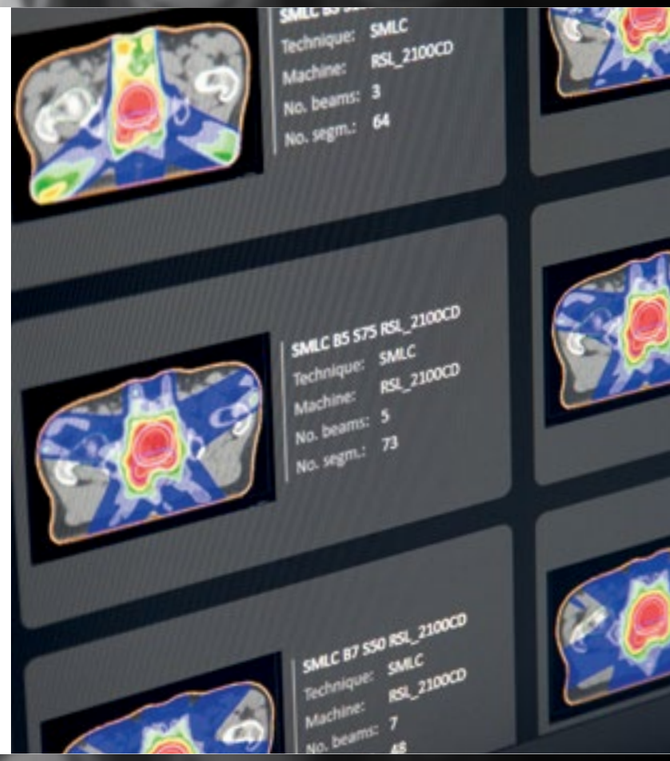
Physicians have more options to explore and can evaluate combinations that would have been too time-consuming to consider with a manual planning process. Plan Explorer saves planning time and enables clinics to get more from their treatment machine resources.

POTENTIAL CLINICAL BENEFITS:

- Ensure every radiation treatment is delivered with the highest possible efficiency, with an optimal combination of treatment technique and machine
- Get more from existing treatment delivery machines
- Free up time for plan evaluation

FILTERS
Filter plans easily by machine, number of beams, segments, MU or clinical goals.

RADAR CHART
Each line in the chart represents one goal. The green color indicates that a goal is fulfilled. Pink alerts you when a goal is not fulfilled.



...WITH SMART AUTOMATION

AUTOMATED BREAST PLANNING

RayStation's automated breast planning module is the first step in our ambition to automate standard procedures.

The module was initially developed at Princess Margaret Hospital (PMH) in Toronto, Canada. Between 2009 and 2012, PMH ran a large-scale clinical study to evaluate the performance of its automated treatment planning methodology for tangential breast intensity-modulated radiation therapy (IMRT). Automated planning was used with 97% of patients receiving tangential breast IMRT during the time interval studied, i.e., 1661 patients. The study showed an increase in clinical acceptance using this fully automated method.

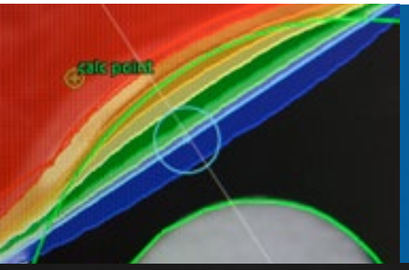
PMH concluded that the method could make a big contribution to efficiency, standardization and quality in the treatment planning process, as well as speeding up adoption of IMRT and giving breast cancer patients better access to care improvements.*

The automated breast planning module provides tools for generation of tangential breast IMRT plans using heuristic optimization.

KEY FEATURES:

- Automatic detection of radio-opaque markers defining the breast
- Automatic contouring of all the relevant targets and organs at risk
- Automatic setup of beams, including heuristic optimization of gantry and collimator angles
- Automatic creation of objective functions, optimization and segmentation settings and clinical goals

*Purdie, TG, et al. Automated planning of tangential breast intensity-modulated radiotherapy using heuristic optimization. Int. J. Radiation Oncology Biol. Phys. 2011 Vol. 81, No.2, pp 575-583.



PLAN-GENERATING PROTOCOLS

RayStation includes a range of automation tools, including templates and plan generation protocols. A protocol is a list of plan-generation steps that can be applied automatically. Examples of plan-generation steps include atlas-based segmentation, plan creation, beam setup, selection of optimization functions, optimization settings, optimization, reduce OAR dose and compute dose. When a protocol is run, it will automatically create a plan using the included steps, which significantly reduces planning time.

FALLBACK PLANNING: TREATMENT GOES ON NO MATTER WHAT

Fallback planning is a tool for creating additional plans in the event that a patient needs to be treated using a different machine, and possibly with a different modality and/or treatment technique.

The fallback planning module can drastically reduce planning time in emergency situations, allowing treatment to continue and reducing stress on staff. Fallback planning can also be used to validate the modality selected for treatment, ensuring that the most efficient approach is utilized for each patient.

Fallback plans are generated after plan approval, based on previously created protocols. The process is fully automated, with no user interaction required. However, fallback plans can still be modified manually if needed. Plans for any modality, including proton and TomoTherapy, can be converted to photon plans for techniques including 3D-CRT, IMRT and VMAT. Fallback planning uses a dose-mimicking function to replicate the DVH of a given plan, but with a different machine or treatment modality.

After creation, fallback plans can be compared and evaluated using visual tools (DVH curves, dose statistics, dose difference and clinical goals). A fallback plan can then be approved and used for delivery in future fractions. If the original machine becomes available again, it is possible to convert back to the original plan.

The module includes dose-summation tools that enable two plans to be combined using their delivered fractions. This makes it possible to visualize actual composite dose on the patient dataset.

REVOLUTIONIZING COMPUTATION SPEED

RayStation's unrivaled computation speed can radically transform your treatment planning process.

As the computation time is seconds rather than minutes, you can efficiently produce several alternative treatment plans to assess different trade-off situations, instead of opening a second case or going on a break during computations.

Optimization and clinical dose computation on GPU takes less than 10 seconds for a standard prostate IMRT case, and around 30 seconds for a more complex 9-beam IMRT head and neck case on a high resolution 2 mm dose grid.*

Depending on the modality, RayStation uses different beam models and dose calculation engines to calculate dose. CC-dose algorithms can be run on CPU, and on GPU for faster computations.

*Results may vary as dose-computation time depends on several variables.

IMRT, 7 BEAM
PROSTATE
3 MM GRID
0.7 MILLION VOXELS
40 ITERATIONS

6s OPTIMIZATION

3s DOSE COMPUTATION

VMAT
PROSTATE
3 MM GRID
0.7 MILLION VOXELS
40 ITERATIONS

22s OPTIMIZATION

8s DOSE COMPUTATION

IMRT, 9 BEAM
HEAD & NECK
3 MM GRID
2.1 MILLION VOXELS
60 ITERATIONS

17s OPTIMIZATION

7s DOSE COMPUTATION

VMAT, DUAL ARC
HEAD & NECK
3 MM GRID
2.1 MILLION VOXELS
80 ITERATIONS

117s OPTIMIZATION

17s DOSE COMPUTATION

SCRIPTING: YOUR IMAGINATION IS THE LIMIT

Scripting in RayStation provides automation, connectivity and flexibility beyond the standard user interface.

The script languages, IronPython and CPython, let you access all capabilities of the operating system and other applications, including the ability to write files, start processes, communicate with other computers and control other scriptable applications such as Microsoft Office or .NET.

AUTOMATION
Clinic-specific procedures can be automated through scripting. A script can check for properties in a plan, such as small segments, disconnected target volumes, hotspots and undesirable gantry and couch angles. The system can then display a warning message or create a report.

CONNECTIVITY
Scripting provides a way to customize the interaction between RayStation and other systems for scenarios where DICOM is not sufficient.

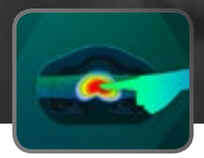
FLEXIBILITY
Scripting enables you to use the power of RayStation in the way that best serves the needs of your facility. It can be used to enable functionality that is not specifically available in the standard interface. For instance, automatic marker detection, export of images of non-standard dose planes and images of all control points can be utilized as desired.

SCRIPTING FOR MULTIPLE PATIENTS – A POTENTIAL RESEARCH TOOL
Because scripting can be done for multiple patients, it is an ideal tool for retrospective data analysis and for evaluating new treatment techniques. It is possible, for example, to systematically alter a specific parameter in a script used throughout a cohort of patients, then record the effects or simply extract data, such as dose statistics.

> *"Akron General was able to streamline these processes while also avoiding human input errors, making the entire process less intense and time-consuming for the dosimetrist."*
>
> – Jeremy Donaghue, Chief Physicist, Akron General Health System, Ohio, US

REALIZE THE FULL POTENTIAL OF PROTON THERAPY

Proton therapy is a strong area of focus for RaySearch. This advanced modality offers many significant benefits, especially regarding dose conformance and sparing of healthy tissue. RayStation makes it possible to create outstanding treatment plans for a large variety of proton delivery techniques and beamlines, and the proton module can be combined with multi-criteria optimization.



PROTON PLANNING

RayStation supports proton therapy systems from IBA, ProNova, Mitsubishi, Mevion, Varian and Sumitomo, as well as synchrotrons. The system offers the full range of treatment options, including pencil beam scanning, double scattering, uniform scanning, line scanning and wobbling. The RayStation proton module also includes a full Monte Carlo dose engine for PBS that can be used for both final dose calculation and optimization.

RayStation enables design and optimization of proton treatment plans for actively scanned pencil beams, with the option to include block aperture or MLC collimation. All optimized plans are directly deliverable since the spot weight limits are taken into account in the optimization loop.

The proton module also provides tools for efficient planning of uniform scanning, double scattering and Sumitomo wobbling. These tools enable the creation of clinical treatment plans and subsequent milling-machine instructions, including automated production of compensators and blocks, with manual editing possibilities.

Because RayStation is a complete treatment planning system that supports many different modalities, planning of proton treatments in conjunction with photons is possible. The fallback planning module also enables proton plans to be converted into photon plans, ensuring there is no interruption in treatment.

4D-ROBUST OPTIMIZATION

The inclusion of 4D-CT images in the robust optimization process addresses situations where there is significant relative intrafractional motion of internal organs, for example in the thorax during free breathing. Further challenges include the interplay effects that can occur when the timing of delivery is similar to the timing of intrafractional organ motion. RayStation includes tools, such as interplay evaluation, to mitigate these effects. Interfractional anatomical changes can be effectively addressed through RayStation's adaptive replanning capabilities.

KEY FEATURES:

- Monte Carlo dose computation
- 4D-robust optimization
- PBS optimization with apertures
- Multi-criteria optimization, including robustness
- Fully integrated adaptive planning
- Automatic creation of backup photon plans

"Computation speed is a key component when optimizing for multiple scenarios; RayStation is impressively fast, even when running as many as 21 scenarios for one case."

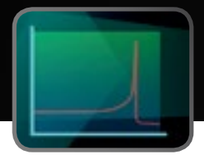
– Anaïs Gérard, Medical Physicist, Centre Antoine-Lacassagne, Nice, France

"RayStation offers a much-needed improvement of the treatment planning environment for proton radiation therapy. Using RayStation helps us to improve our efficiency in producing highly optimized treatment plans for our patients and offers advanced plan evaluation tools for the clinical team. RayStation has allowed us to ramp up our patient numbers rapidly, including very complex cases at a very early stage of operations."

– Niek Schreuder, Chief Medical Physicist, Provision Center for Proton Therapy, Knoxville, US

MAKE CARBON-ION TREATMENT A REALITY

Carbon-ion therapy, the most advanced form of radiation therapy, has several clinical advantages. Dose deposition can be controlled even more precisely than with other types of particle therapy, which allows for improved sparing of healthy tissue. Carbon ions also have a higher relative biological effectiveness (RBE) in the tumor than other types of radiation.



CARBON-ION PLANNING

RayStation provides the tools for designing and optimizing actively scanned pencil beam carbon-ion treatment plans. It includes a pencil beam dose engine to compute physical dose and RBE-weighted dose according to the Local Effect Model. The optimizer can mix objectives for physical dose and RBE-weighted dose. All plans are directly deliverable on synchrotrons after optimization, since the minimum spot weight is taken into account in the optimization, as well as other synchrotron-specific machine constraints.

The first clinics to adopt this new functionality in RayStation were MedAustron in Austria and Centro Nazionale di Adroterapia Oncologica (CNAO) in Italy.

In the rayBiology application, you can define Local Effect Model parameters for the tissue sets to be used for planning.

KEY FEATURES:

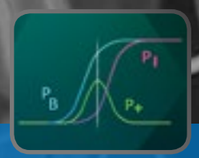
- Multi-field optimization of carbon-ion pencil beam scanning
- Fast GPU-based dose computation
- System-wide handling of physical and RBE weighted dose
- Inclusion of synchrotron parameters
- Scan spot order sorting
- Spot visualization
- Manual editing and filtering of spot pattern
- Combination planning with other modalities

We are really impressed by the flexibility and dedication RaySearch has shown to implement our requirements in RayStation in such a short time. A great advantage when working with RaySearch has been their collaborative spirit and willingness to let us test, review and evaluate the system continuously. This has helped us define our priorities and contributed to a good learning process which ultimately led to a tailor-made proton and carbon ion treatment planning system."

– Gabriele Kragl, Medical Physicist, MedAustron, Wiener Neustadt, Austria

TAKE RADIOBIOLOGICAL EFFECTS INTO ACCOUNT

The use of radiobiological response models brings the planning process closer to the aim of creating a plan that maximizes treatment effectiveness while minimizing risk to healthy tissue. The philosophy is to use the biological models to reveal effects that are difficult to understand from dose distribution alone.

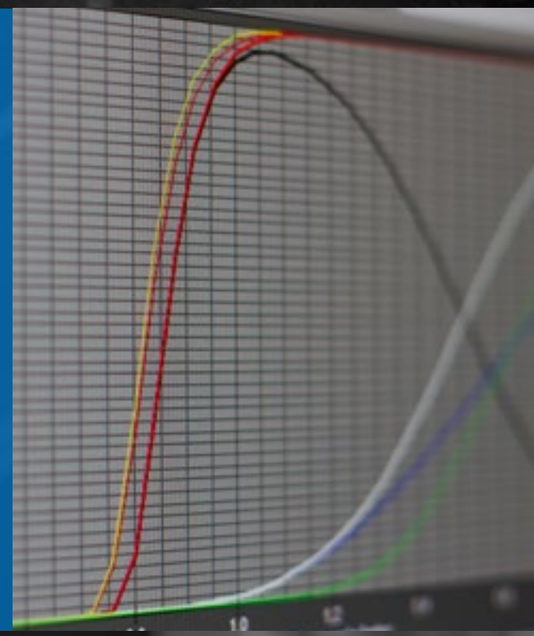


RADIOBIOLOGY

RayStation provides tools for both biological optimization and evaluation. Optimization tools enable optimization directly on the biological indices, in combination with physical-dose-based optimization functions. This makes it possible to configure optimization problems to describe the clinical intentions, such as minimizing normal tissue complication probabilities subject to a guaranteed homogenous target dose within a specified standard deviation.

Evaluation tools include Tumor Control Probability (TCP) and Normal Tissue Complication Probability (NTCP) models that can be combined with tissue repair and tumor growth models.

Because the biological tools are integrated into the plan evaluation module, the physical properties of the existing plan can be easily investigated if unexpected differences in biological response are observed between different plans. There is also a biological evaluation module dedicated to exploration of the biological effects of altering the fractionation schedule of a single treatment plan.



IMPLEMENT ADAPTIVE RADIATION THERAPY TODAY

RayStation was designed from the outset with a strong focus on handling the dynamic aspects of radiation therapy. By explicitly representing the time dimension throughout the domain model, it provides the ultimate framework for planning and managing adaptive radiation therapy.

ADAPTIVE PLANNING

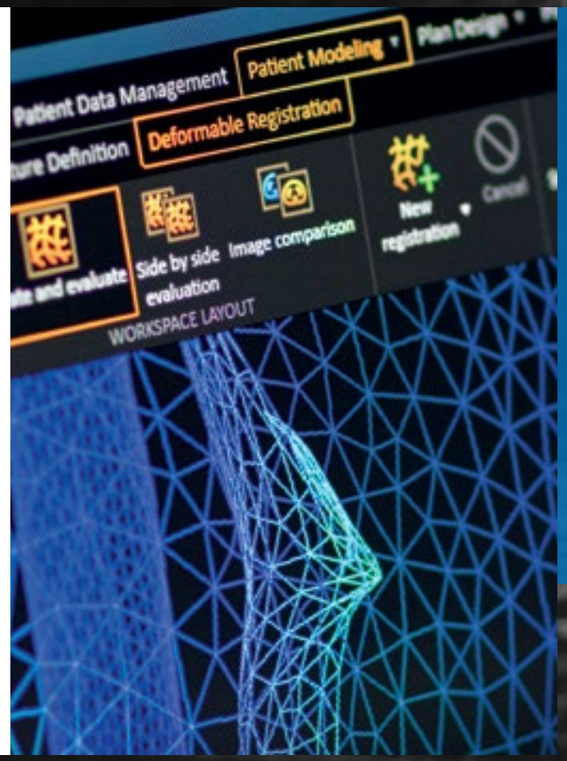
RayStation's adaptive replanning tools and powerful deformation algorithms help to improve the planning process and increase accuracy of treatment.

When images of the patient in treatment position, from CT, PET/ CT, cone-beam CT or MR, are acquired during the treatment course, RayStation makes it possible to establish a deformable registration between the new geometry and the planning geometry.

This registration can be used to recalculate, deform and accumulate doses from different fractions in a common geometry, precisely computing the dose delivered to the patient.

If there are deviations from the planned dose distribution that require action, a wide range of adaptive offline and online replanning tools are available that take into account the accumulated dose and observed deviations of the patient geometry.

Plans can then be reoptimized and adjusted to compensate for dose coverage problems, or to adapt to a predicted clinical goal violation. The replanning options range from simple adaptations, such as adjustments of beam weights, to complete reoptimization of beam profiles.



"Investing in RayStation has given us a far superior planning infrastructure. Adaptive therapy demands a high-speed planning system, combined with high-quality imaging. It's only feasible with a system such as RayStation, which is extremely fast and has excellent tools for the clinician."

– Giuseppe Sasso, Clinical Director, Department of Radiation Oncology, Auckland City Hospital, New Zealand

ACCURATE AND EFFICIENT CONTOURING

RayStation provides tools for creating a rich and accurate representation of the patient anatomy for the treatment planning process.

MANUAL AND SEMI-AUTOMATIC CONTOURING

RayStation includes a comprehensive toolset for manual contouring, such as polygon, freehand, paintbrush/2D rollerball and local deformations (push-and-pull). The image-guided smart brush and smart line tools facilitate contouring by snapping to image features. There is also support for automatic interpolation of intermediate contours, seamless 2D-3D conversion and 4D visualization. With derived ROIs, it is possible to create Boolean ROI algebra structures where the Boolean expression is stored in the structure. Structure templates can be saved with or without the geometries included, which can then be recalled for future patients.

MODEL-BASED SEGMENTATION (MBS)

MBS is a semi-automatic tool for delineation of ROI based on statistical information about organs. Volumetric images are segmented semi-automatically, utilizing a combination of gray-scale gradients and models with knowledge of how organs may change shape. Multiple ROI can be delineated simultaneously, which increases throughput, accuracy and reproducibility.

MULTI-ATLAS BASED SEGMENTATION

In atlas-based segmentation, existing data from the clinic database is used to create templates with multiple image sets – atlases. The geometries contained in each atlas can be manually contoured or generated with MBS. New image data is segmented by locating the best matching atlases through rigid image registration. For all matching atlases, a deformable registration is computed and the structures are deformed onto the new image set. This gives a number of segmentation results that in the end are merged to one result using a fusion algorithm. If MBS regions of interest are available in the template, they may be automatically adapted after atlas-based initialization is completed.

IMAGE REGISTRATION/FUSION

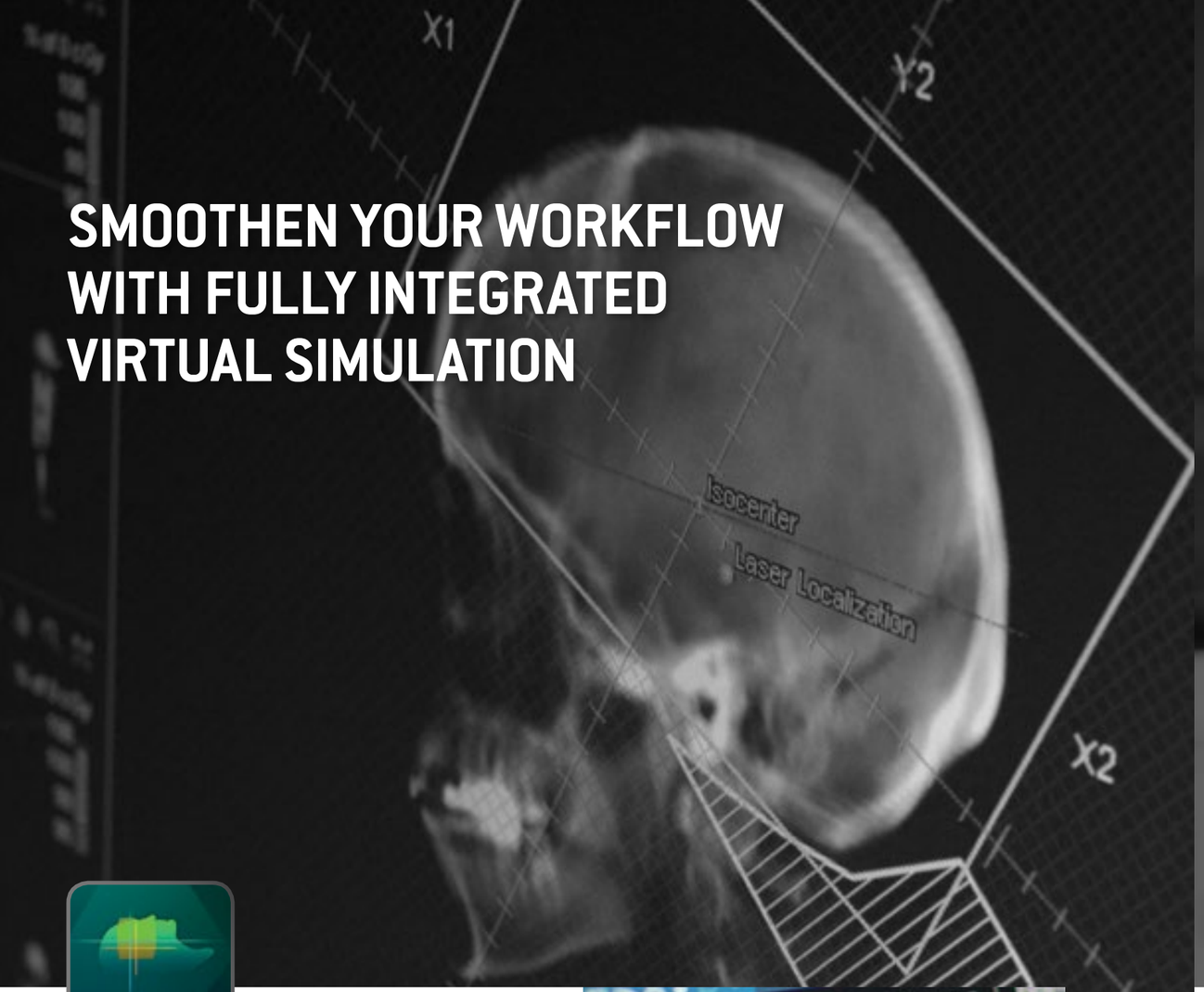
Both rigid and deformable registration of multimodality imaging (CT, CBCT, PET or MR) are fully supported and integrated. These capabilities can be used to show fused images as a reference while contouring and to map regions or points of interest between image sets.

EVALUATE YOUR PLANS SMOOTHLY AND SIMULTANEOUSLY

PLAN EVALUATION

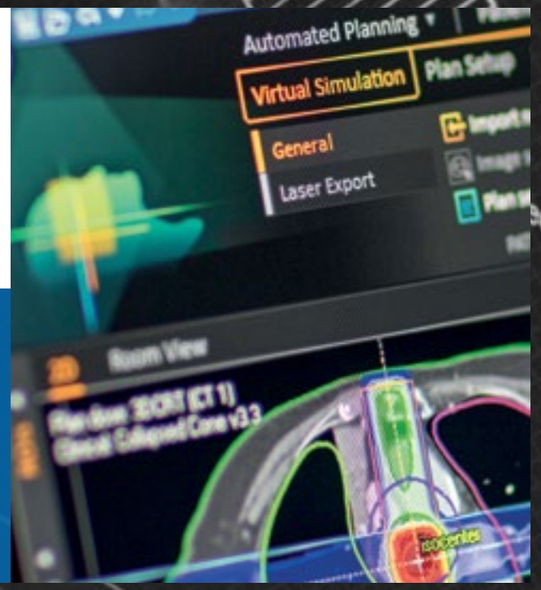
RayStation offers a comprehensive toolbox for evaluation and comparison of treatment plans and plan approval. Several predefined layouts are available for simultaneous comparison of dose distribution, dose statistics, clinical goals and dose-volume histograms for up to three different plans. Dose can be directly computed on additional image sets and summed up using deformable registration. For evaluation of robustness, dose can also be computed for a density perturbation or isocenter shift.

SMOOTHEN YOUR WORKFLOW WITH FULLY INTEGRATED VIRTUAL SIMULATION



VIRTUAL SIMULATION

RayStation offers a dedicated workspace for performing virtual simulation tasks related to isocenter placement, export to patient marking systems and beam design. This will smoothen your workflow prior to planning as the virtual simulation module is integrated into RayStation.

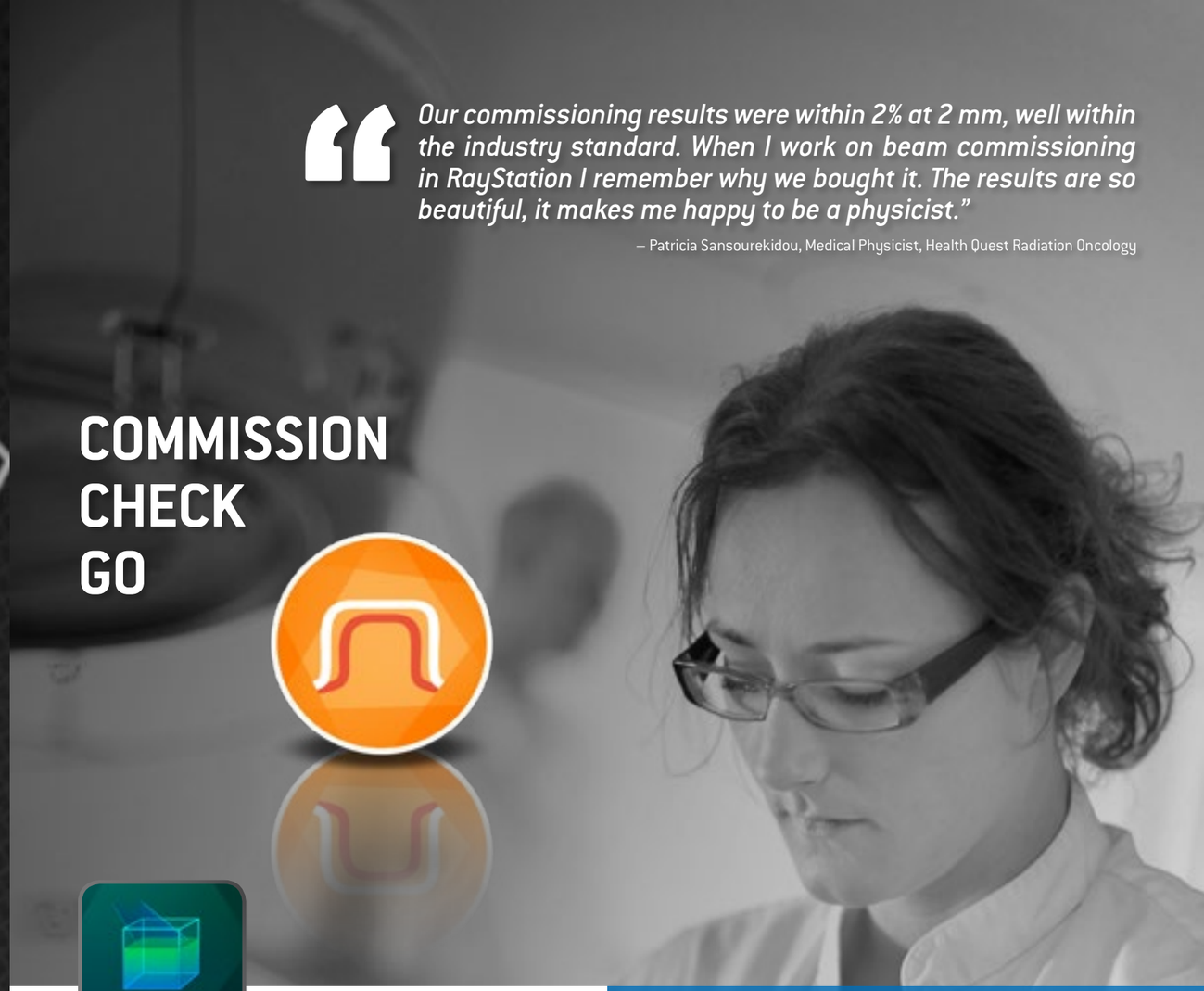


KEY FEATURES:

- Dedicated workspace for virtual simulation
- One-click creation of plan with orthogonal beam pair
- Isocenter placement using DRR pair
- Export to patient marking systems
- A multitude of beam-design tools for field shaping

COMMISSION CHECK GO

> *Our commissioning results were within 2% at 2 mm, well within the industry standard. When I work on beam commissioning in RayStation I remember why we bought it. The results are so beautiful, it makes me happy to be a physicist."*
>
> – Patricia Sansourekidou, Medical Physicist, Health Quest Radiation Oncology



COMPATIBILITY AND HARDWARE INDEPENDENCE

RayStation is compatible with most commercially available linear accelerators. Its data model is fully compatible with the DICOM standard, making it easy to import or export any DICOM RT object. This includes multiple CT, MR and PET image series, 4D-CT structure sets, doses and RT Plan and RT Ion treatment plans. In addition, RayStation communicates with other data sources, such as IHE RO, DICOM senders and receivers and DICOM archives, using either file transfer, DICOM storage service classes or DICOM query/retrieve.

RayStation offers unlimited patient data storage and allows for flexible configuration of multiple parallel databases and gradual archiving.

A dedicated graphical user interface is available for photon, electron, proton and TomoTherapy modeling. This workspace allows for evaluation of models and treatment planning tools prior to commissioning a machine.

KEY FEATURES:

- Collapsed cone photon dose calculation engine for high accuracy
- Singular value decomposition photon dose calculation engine for real-time purposes
- State-of-the-art direct Monte Carlo code for electrons and proton PBS
- Highly optimized proton pencil-beam algorithm with 19-fold multi-tracing per spot and separate handling of the nuclear halo effect
- Pencil-beam scanned carbon dose computation using pencil-beam dose engine and RBE dose computation, according to the Local Effect Model version 1

QUALITY ASSURANCE

The module for Quality Assurance preparation makes it straightforward to transfer the clinical plan to a phantom and recalculate dose, either beam by beam or for the entire plan. The output from the module is the dose distribution in DICOM format or a 2D dose plane, a QA report and, optionally, a new treatment plan with collapsed gantry angles.

MORE THAN SERVICE – A COMMUNITY

RAYSTATION SUPPORT COMMUNITY

At RaySearch, we consider all our people to be part of the support team. We are proud to have built an organization that includes experts in many different fields, including programmers, scientists, physicists, researchers, dosimetrists and interface designers. Our online community gives you quick access to these experts, enabling you to get your questions answered and discuss the issues that matter to you.

The online community is also an easy way to connect with RayStation users. You can ask questions, open cases, request enhancements and browse the solution database for answers to frequently asked questions. All cases logged in the portal are investigated by a RayStation expert to provide the best solution to your problem.

We listen to your needs and try our best to accommodate enhancement requests for future versions of our software. All software upgrades already licensed are completely free of charge with a valid service contract, ensuring you have access to new functionality as soon as it is released. RaySearch will always work with you to help implement the advanced technologies and workflows provided in RayStation.

And if you prefer the traditional means of communication, our service team is available via phone and email worldwide. Real people will answer your call, and there are no automated phone menus to get past.

INSTALLATION

Implementing a new treatment planning system, or replacing an existing platform, is not an easy task. So we strive to streamline the installation to ensure it has minimal impact on the daily work of clinical staff. For each installation, RaySearch assigns a project manager who will be the single point of contact. The project manager leads a team of experts and is in communication with the clinic throughout the process.

USER MEETINGS AND TRAINING

RaySearch regularly provides in-house and customized on-site application and physics training for RayStation users. These training courses are approved for continuing education credits in different countries.

Because we want you to be part of the development process, we also run regular user meetings. These are a forum to get updated on the latest product developments, share best practice with other users and talk directly with our management teams.

RaySearch Laboratories

DEDICATED TO CANCER TREATMENT SOFTWARE

RaySearch is advancing cancer treatment through pioneering software. We believe software has unlimited potential, and that it is now the driving force for innovation in oncology. Medical science never stands still, and neither does RaySearch. We work in close cooperation with leading cancer centers to bring scientific advancements faster to the clinical world. Today, our solutions support thousands of clinics worldwide in the fight against cancer.

RayStation®, our next-generation treatment planning system, supports the quality of decision-making, creates new treatment possibilities and gets maximum value from your existing equipment. By making treatment planning faster, easier and more flexible, we enable better care for cancer patients worldwide.

And this is just the beginning.