Panther DAO MLC IMRT

Revolutionary Optimization Technology

Panther DAO IMRT takes IMRT to the next level with Direct Aperture Optimization (DAO). Powered by a new 3D convolution/superposition dose calculation engine, and an algorithm which includes all the delivery constraints within the optimization process, Panther DAO IMRT is the only true WYSIWYG inverse planning system on the market, and the first and only commercial treatment planning system to incorporate DAO.

**Simplified IMRT**

Typically, traditional IMRT techniques use a two-step approach to arrive at a final treatment plan. First, a fluence map is optimized from each beam direction (optimization). Then, the set of aperture shapes that most closely reproduces each fluence map (leaf sequencing) is determined. This approach is flawed because the delivery constraints are not easily enforced during the optimization; and the number of segments is typically 2-3 times the number of intensity levels.

With DAO, the positions of the leaves and relative weights of the individual apertures are simultaneously optimized. DAO eliminates the leaf-sequencing step. Since the user pre-specifies the number of apertures to deliver from each beam direction, resulting plans are much more efficient.

**Clinical Benefits of DAO IMRT**

Up to 65% reduction in segments
- Less wear-and-tear on equipment
- Lower equipment maintenance costs
- Longer equipment life span
- Simplified Quality Assurance

Up to 60% reduction in Monitor Units (MUs)
- Reduced total delivery dose
- Fewer radiation protection concerns

Less time required to deliver treatment
- Improved patient comfort
- More accurate delivery of dose
- Ability to treat more patients in the same amount of time

“The DAO IMRT planning has consistently generated high quality IMRT plans that require the least amount of delivery time as compared with other commercial planning systems. Through hundreds of IMRT verifications, where the calculated doses and the measured doses are compared, the physicists are very satisfied about the dose calculation accuracy of the systems. The dosimetrists using the systems for generating plans are very happy about the ease of use and intuitiveness of the operations.”

Cedric X. Yu, D.Sc, FAAPM
Professor of Radiation Oncology,
Director, Division of Medical Physics
University of Maryland,
School of Medicine
Panther DAO MLC IMRT Features

Key Features

State-of-the-art Optimization Algorithm:
- User selectable number of segments
- Quick convergence ability of the algorithm reduces the time for optimization
- Eight different types of constraints supported, including Equivalent Uniform Dose (EUD)
- MLC leaf increments as small as 1mm are possible
- Voxel spacing as small as 3mm x 3mm x CT slice thickness
- Absolutely no deterioration in the quality of the DVH graphs after applying the optimization results
- Non coplanar beams support for IMRT

Efficient User Interface:
- Single window interface for the complete Optimization procedure
- Live graphical user interface to alter constraint parameters during the optimization cycle in real time
- Can stop, quit and continue optimization as needed
- Constraint Libraries supported
- Display of fluence maps for each selected segment of the beam in BEV
- Tabular display of sequential fluences for the segments of each beam
- Ability to allow user to change the sequence of the segments in any of the beams
- MU Display for each of the segments in total or per fraction
- Plan template managers allow saving and retrieval of IMRT plans at ease
- One button push to IMRT phantom for QA

Standard Features

- Fully DICOM 3.0 and DICOM RT compliant for import and export
- Support for CT, MRI, PET, SPECT, Ultrasound images
- Automatic and manual Image Fusion
- Support up to 60 contours
- Undo, Redo contouring utility
- Multiple Boolean operators
- Asymmetric margins
- 512 x 512 DRR with enhancement tools
- Single interface window throughout the planning procedure
- CT view in 3D with efficient multi-planar reconstruction.
- Plan comparison
- User selectable window layout
- Zoom any view to full screen
- Isodose, Iso-Fill and Colorwash features
- Beam, Plan templates
- Photons and Electrons beams can be combined
- Composite plans with Brachytherapy
- Side by side plan comparison
- DVH comparison
- Multiple dose calculation algorithm support
- Relative and Absolute dose values
- User defined calculation matrix
- Non coplanar beams planning
Panther 3D Conformal Therapy
Accuracy, Simplicity and Ease of Use

Panther 3D Conformal Therapy is designed to improve efficiency in the busy radiation oncology department of today, delivering more value to the healthcare environment that expects cost reductions and higher productivity without sacrificing the level of patient care.

Prowess has a competitive advantage by building Panther 3D Conformal Therapy on the familiar and most user-friendly Windows® platform. Users are able to generate treatment plans quickly due to the familiar Windows® “look & feel” and Panther’s intuitive user interface.

Recognizing the financial realities of today’s medical environment, Panther 3D Conformal Therapy is designed to be completely modular. Upgrading with additional modalities in the future seamless.

Affordably priced, backed by extensive training and prompt technical support, Panther 3D Conformal Therapy is the most comprehensive and cost-effective solution for ALL your treatment planning needs.

Simplicity

This is the only Treatment Planning System that uses a single platform and the same interface for all modules. The range of modules include: External Beam; DAO IMRT; Jaws-Only IMRT; CT Simulation and Brachytherapy.

Networking

All Physicians, Physicists and Dosimetrists can access and work on plans from their own workstations or laptops regardless of where they are located.
Panther 3D Conformal Therapy Features

Key Features

Image Acquisition
- Fully DICOM 3.0 and DICOM RT compliant for import and export
- Scanner and digitizer interface

Image Fusion
- Support for CT, MRI, PET, SPECT images
- Automatic and manual Image Fusion
- Able to contour on master or slave image series
- Checkboard feature

Contouring Tools
- Support up to 60 contours
- Advanced automatic and manual contouring tools
- Easy to use editing, correction tools
- Undo, Redo contouring utility
- Multiple Boolean operators
- Multiple 3D image set support
- Asymmetric margins

Dose Calculation Algorithms for 3D Conformal Therapy
- Fast Photon: Equivalent TMR and 3D ray tracing
- Scatter Calculation with/without heterogeneity correction
- Electron: 3D Ray tracing based on measured beam data

Visualization Tools
- 512 x 512 DRR with enhancement tools
- Single interface window throughout the planning procedure
- CT view in 3D with efficient multi-planar reconstruction
- Plan comparison
- MLC, Block overlay in BEV
- Bolus editing tool
- User selectable window layout
- Zoom any view to full screen
- Isodose, Iso-Fill and Colorwash features

Planning
- Beams, Plan templates
- Photon and Electron beams can be combined
- Composite plans with Brachytherapy
- Supports fixed or rotational beams
- Side by side plan comparison
- DVH comparison
- Non coplanar beam planning

Dose Calculation Algorithms for Panther 3D Conformal Therapy Pro
- Fast Photon: Equivalent TMR and 3D ray tracing
- Collapsed Cone Convolution Superposition
- Electron: 3D Ray tracing based on measured beam data
Panther RealART
Real-Time Treatment Planning for Utmost Precision

Limitations of current treatment techniques:
Changes in patient anatomy and differences in shape and location of tumor during the course of treatment present a great challenge to clinicians in developing an optimal treatment plan for radiation therapy. Traditionally, they have relied on diagnostic CT images for treatment planning; but this approach can sometimes be dangerous. It does not provide the means to adjust the plan to account for ongoing bodily changes; making it necessary to radiate a larger area to ensure tumor coverage, but at the expense of damaging healthy tissue.

In the case above, a significant deformation of the rectum occurred during the course of treatment; changing tumor form and position. Using current treatment techniques, a larger area is radiated in order to ensure tumor coverage, often overdosing healthy tissue.

The introduction of advanced imaging techniques like CT-on-Rails and Cone Beam CT have provided clinicians the ability to track patients’ daily bodily changes, but not the means to adjust treatment plans to accommodate anatomical changes during the course of treatment.

RealART Solution:
RealART solution from Prowess Inc. provides the answer to these problems. It allows real-time plan adaptation based on inter-fractional anatomic variations and incorporates current shape and location of tumor - eliminating the need for patient re-positioning. This technique deivies utmost precision of radiation delivery for maximum treatment effectiveness and patient safety.
RealART Treatment Process

CT images* taken right before treatment

Total Process Takes Approx. 9 Minutes

Actual time will depend on user familiarity with products

Re-optimize and review plan to further enhance plan quality

Evaluate the anatomy changes

Original MLC apertures are morphed to new anatomy

Original contours are imported and modified to match anatomy changes

Benefits of RealART

- Treat patients with plans based on the shape of the anatomy on the day of treatment.
- Optimize the plan to a particular treatment fraction.
- Better dose coverage of the targets.
- Real control over dose delivered to spare healthy tissues.
- Patient re-positioning no longer needed.

Dose Volume Histogram Improvements

This advanced technology is available only from Prowess Inc. and can be used in conjunction with CT-on-Rails systems.

*Image above indicates workflow with Siemens CTVision™ System.