

TREAT
WHAT **see**
YOU **what**
SEE **you**
treat



vero

» **VERO FINALLY
COMBINES THE LATEST
DEVELOPMENTS OF
THE LAST DECADE INTO
ONE SYSTEM.** «

PROF. DIRK VERELLEN | Head of Medical Physics
UZ Brussels

VERO™
SBRT
UNLEASHED **promising
all
around**



Vero™ is about more than cutting-edge technology; engineered into its core is an unprecedented integration, unrestrained research potential, and unlimited long-term investment. Housed inside a modern shell, Vero delivers an ease of handling and intuitive workflow that will change the way hospitals integrate technology. Vero's speed, accuracy and versatility may drive shorter treatment times, higher patient throughput and increased patient access. Vero combines Intensity Modulated Radiation Therapy (IMRT), Volumetric Modulated Arc Therapy (VMAT)*, Image-Guided Radiation Therapy (IGRT) and Real-Time Tumor Tracking*, ushering in a new age of integration and precision dose delivery.

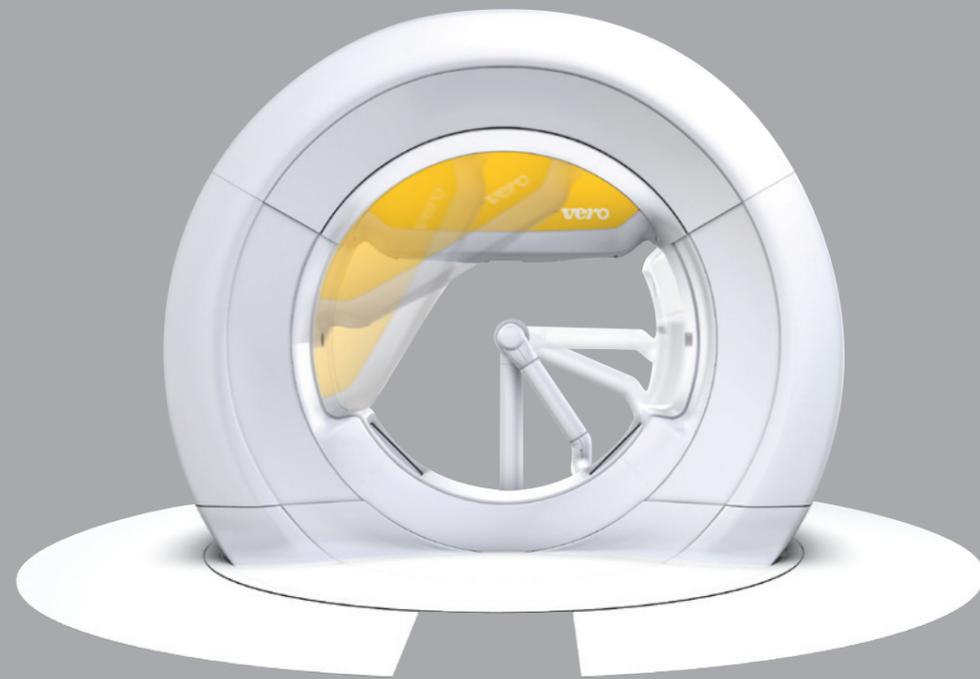
* for comments please see page 19

VERO SBRT UNLEASHED | 3

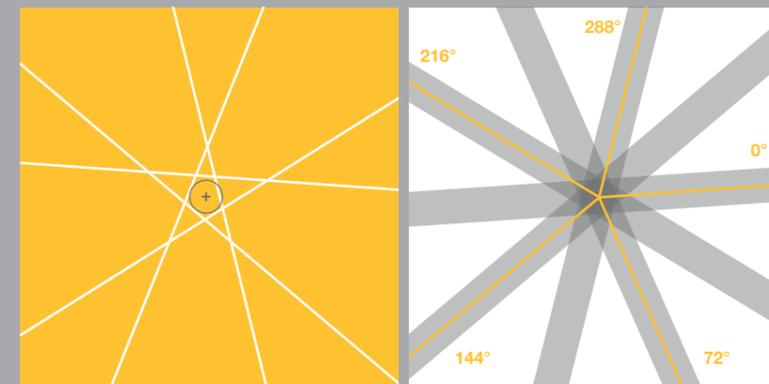
EXACT PERFECTION

high mechanical
accuracy
through closed
ring gantry design

01



Final isocenter definition (R): 0.22962 mm



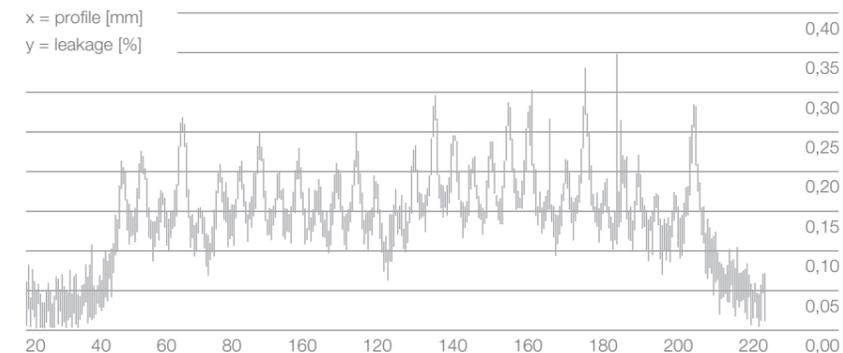
Courtesy of UZ Brussels

STAR SHOT FILM
With its gimbal mechanism, Vero targets the isocenter from any angle with precision of up to 0.1 mm.

Vero offers an increase in mechanical accuracy with its closed ring design. You can calibrate Vero to a pre-defined isocenter, which may increase treatment precision. Target the tumor from any angle with Vero's gimbale accelerator and multi-leaf collimator, compensating for even small deviations and enabling great precision.

- > Treat with increased precision, even during rotation, with Vero's closed ring design. Reduced gravitational effect.
- > Calibrate to a pre-defined isocenter, and compensate for deviations, from any angle with Vero's gimbale accelerator and multi-leaf collimator.

DESIGNED FOR PRECISION

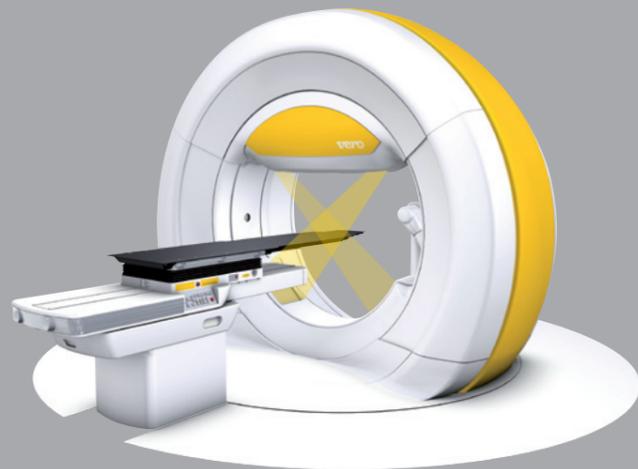


EXCELLENT LOW-LEAKAGE PROFILE
With Vero's low leakage profile, dose to healthy tissue can be reduced.

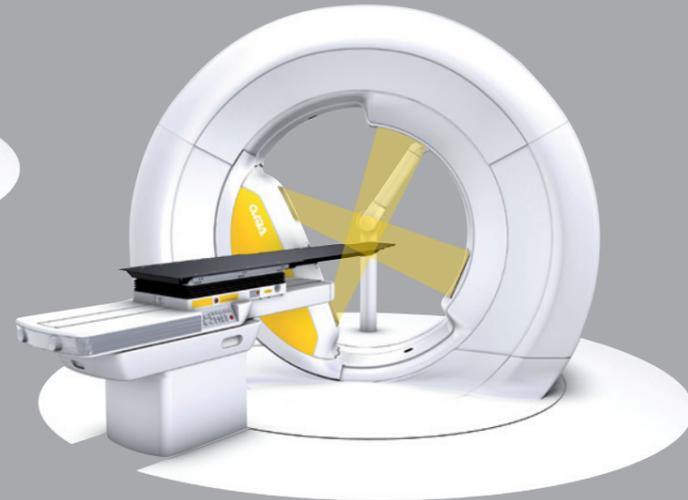
IMAGINE THE CLARITY

unrestricted imaging capabilities in any treatment position

02



Instant verification just a fingertip away.

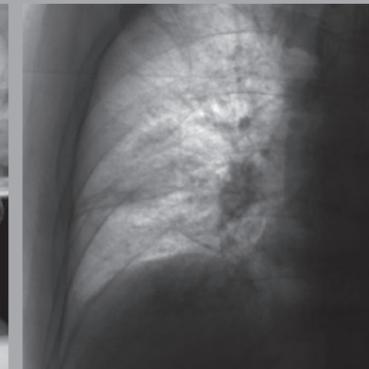


Always-ready imaging capabilities at any treatment position.

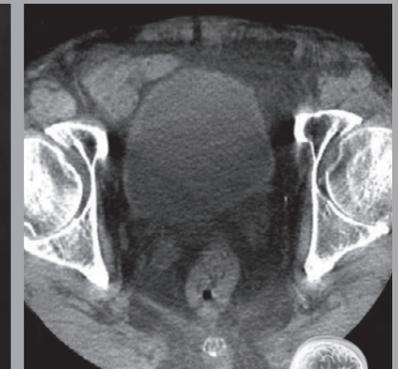
STEREO X-RAY



STEREO FLUOROSCOPY



CBCT



Vero integrates innovative imaging and positioning capabilities. Perform treatment with dual-diagnostic x-ray for simultaneous stereo imaging, 6D patient positioning, and verification at any gantry angle and at any time during treatment. Save set-up and verification time with dual-source Cone Beam CT*. Make one dream a reality with Vero's stereo fluoroscopy, allowing real-time imaging of moving targets.

- > Know, in real-time, and in six dimensions, exact patient position with a wide array of imaging capabilities including dual-diagnostic x-ray for simultaneous stereo imaging.

- > Verify patient position, at any gantry and ring angle, at any time.
- > Perform fast set-up and verification with the dual-source Cone Beam CT.
- > Image moving targets, in real-time, with stereo fluoroscopy.

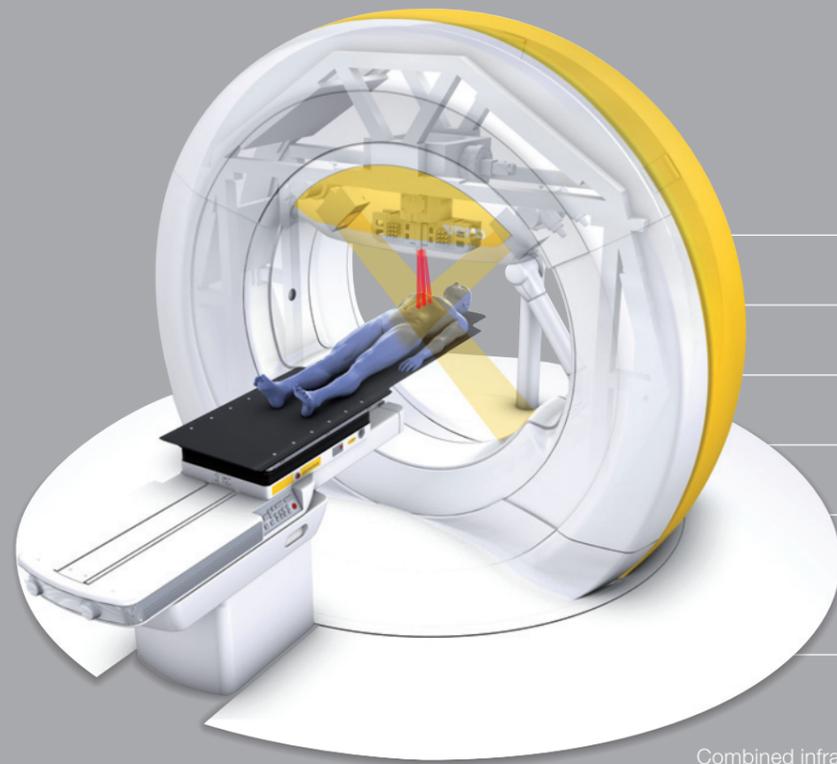
TRULY VISIONARY

* for comments please see page 19

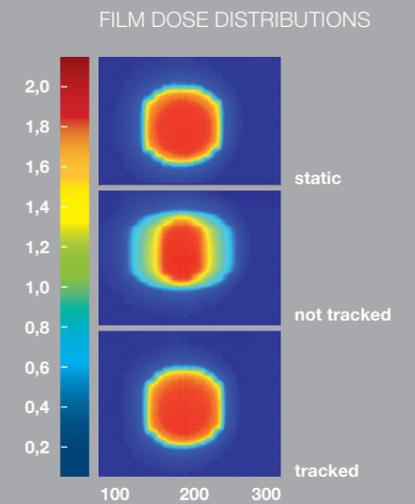
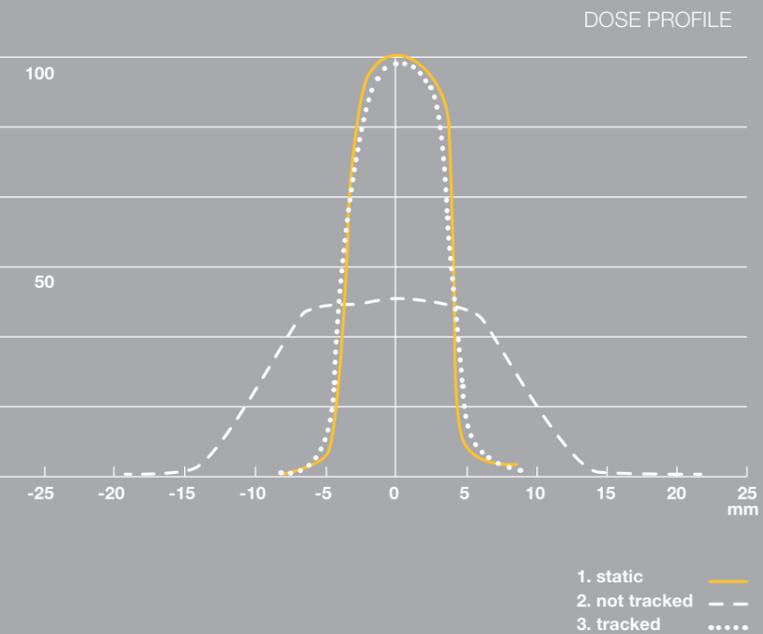
MANAGE TUMOR MOTION

through robotic adjustment of beam assembly

03



Combined infrared and fluoroscopy-guided Real-Time Tumor Tracking*

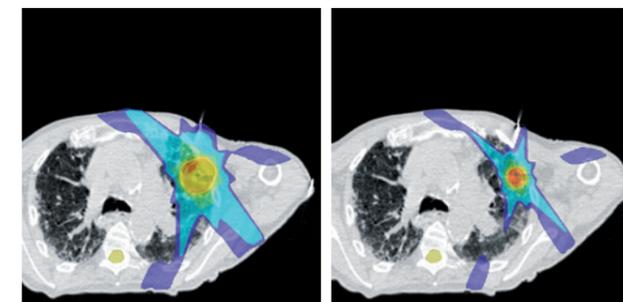


Vero provides high accuracy for treatment delivery, even with moving targets. Core features, such as sophisticated and versatile image-guidance and verification tools, and the first-of-its-kind gimbaled irradiation head with tilt functions – for isocentric and non-isocentric treatments* – deliver targeting confidence. With built-in fluoroscopy, you can dynamically treat tumor areas, even as they move in parallel with breathing and digestion – in real-time and with uninterrupted beam delivery. With Vero's innovative closed-loop, imaging feedback system, you can deliver high quality, targeted and truly individualized treatments for each patient, taking into account personal anatomical changes and individual breathing cycles.

- > Engage moving targets with great confidence and deliver dose with high accuracy.
- > Manage motion with versatile image guidance and verification tools, and the first-of-its-kind gimbaled irradiation head with tilt functions – for isocentric and non-isocentric treatments.

- > Treat moving tumors dynamically and without interruption with proprietary real-time fluoroscopy.
- > Deliver targeted, individualized treatments while continuously tracking and incorporating anatomical changes and breathing cycles with Vero's closed-loop feedback system.

PRECISION IN MOTION



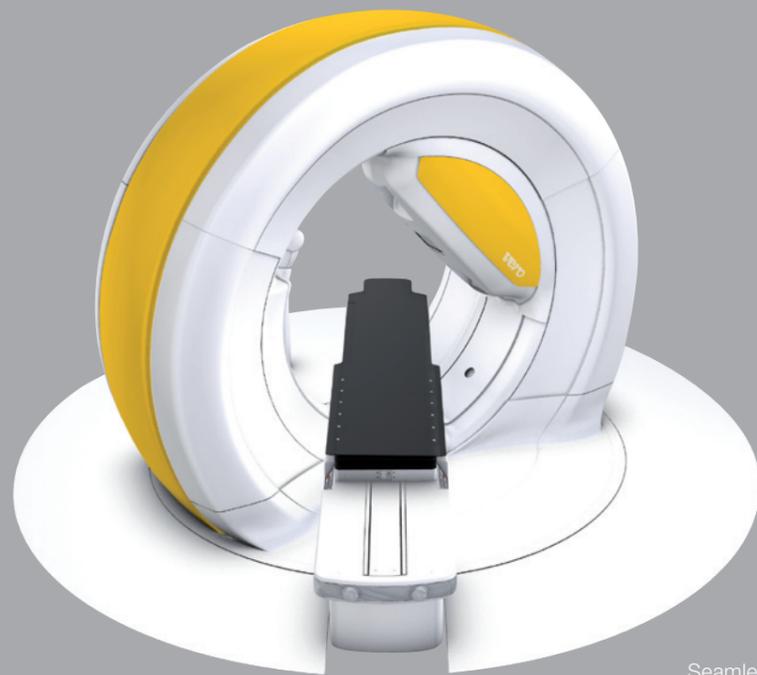
not tracked, treating motion envelope tracked, treating tumor

* for comments please see page 19

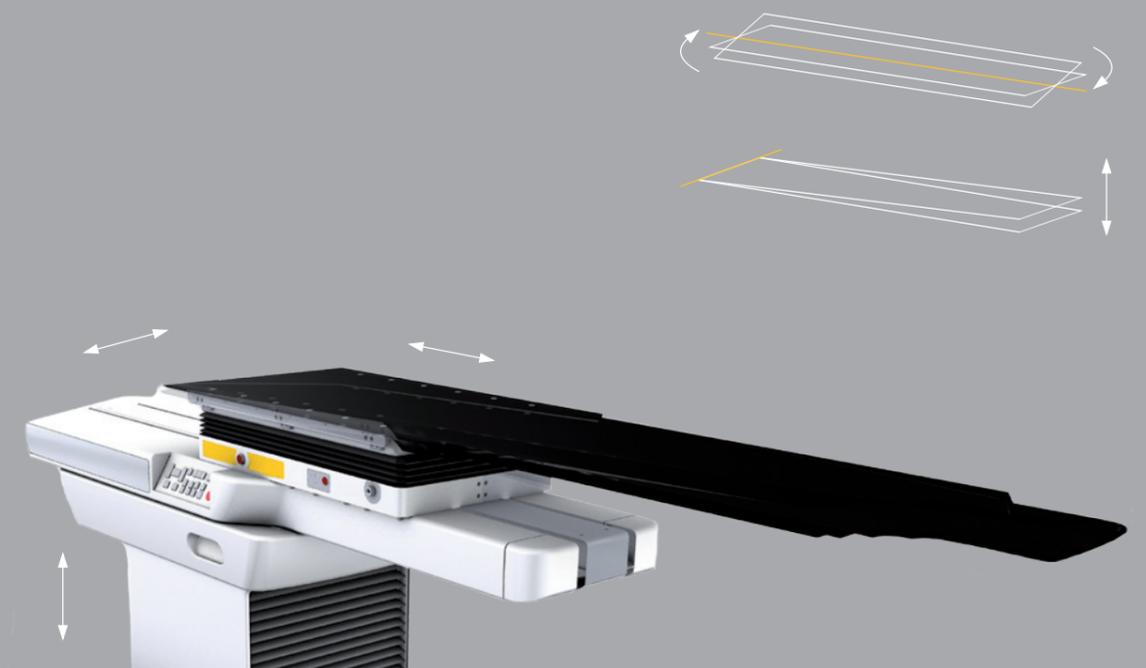
ANGLE FOR FREEDOM

angular freedom without moving the patient

04



Seamless planning and delivery of coplanar and non-coplanar treatments.



Vero allows you to freely choose and combine beam configurations, using coplanar and non-coplanar treatment angles. Maintain high accuracy, even when you employ non-coplanar beam configurations because you need not move the couch or reposition the patient. Once positioned, the patient remains stationary throughout treatment while the system moves with great angular freedom. You deliver precise treatment, from more angles, with less time and effort.

- > Choose and combine beam set-up angles almost without restriction, with Vero's proprietary coplanar and non-coplanar Volumetric Modulated Arc Therapy (VMAT).
- > Set-up and treat with non-coplanar beams from any angle and with great precision. All without moving the couch or repositioning the patient.

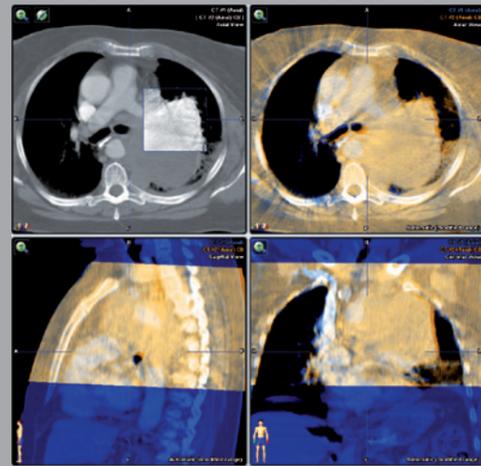
VARIABILITY SIMPLIFIED
More freedom for delivering various treatment approaches.

OPEN FOR OPPORTUNITIES

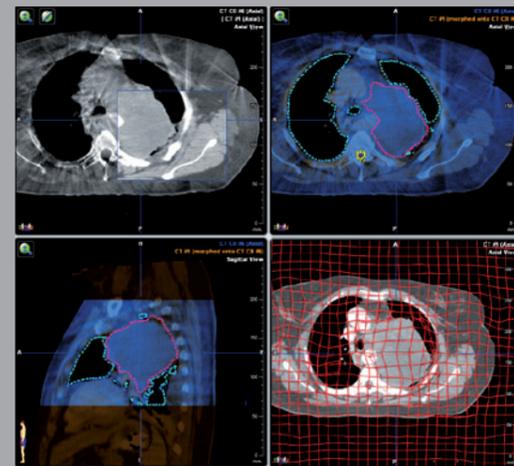
PLAN WITH CONFIDENCE

supported by highly sophisticated software

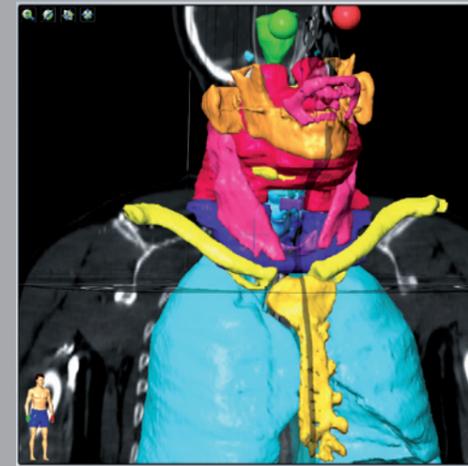
05



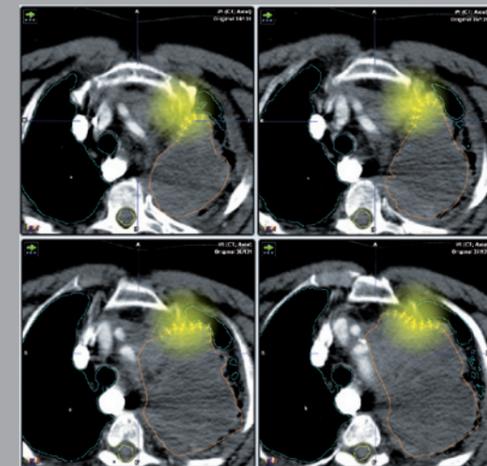
AUTOMATIC IMAGE FUSION



ELASTIC IMAGE FUSION



AUTOMATIC SEGMENTATION



SMART SHAPER

AUTOMATIC IMAGE FUSION
iPlan® offers highly advanced image fusion capabilities. Automatic, accurate co-registration of various data sets offers the necessary precision for stereotactic treatments.

ELASTIC IMAGE FUSION*
Elastic image fusion allows you to automatically segment 4D CT data sets subsequent CBCT data sets and follow-up CT data sets. Evaluate tumor motion, tumor deformation, tumor growth/shrinkage and changes in dose distribution. Evaluate and adapt with ease and speed.

AUTOMATIC SEGMENTATION
Achieve one-button definition of relevant critical structures. Clinical efficiency and planning consistency at your fingertips, ensuring fast and predictable results.

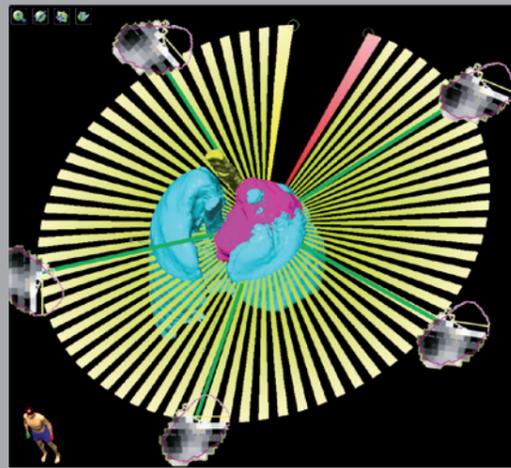
SMART SHAPER
A touch-defined contouring tool that intelligently helps you to quickly and precisely shape 3D objects.

* for comments please see page 19

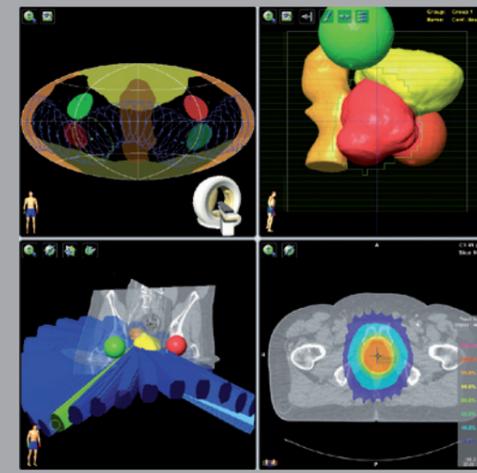
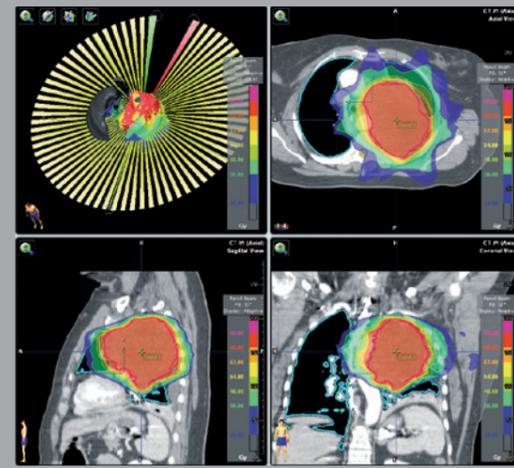
HANDLE WITH EASE

even the most challenging treatment techniques

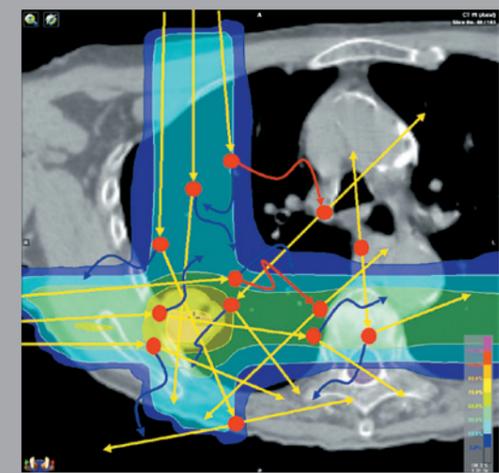
06



HYBRIDARC™



DYNAMIC WAVE ARC



MONTE CARLO

HYBRIDARC™*
SBRT with HybridArc™ dose planning software can shorten treatment times, increase target coverage and improve sparing of organs at risk, compared to conventional techniques.

DYNAMIC WAVE ARC*
Make the most of Vero's motion capabilities with Dynamic Wave Arc. This new treatment technique employs simultaneous gantry and ring motion during dose delivery for effective dose-to-PTV conformity and improved avoidance of organs at risk.

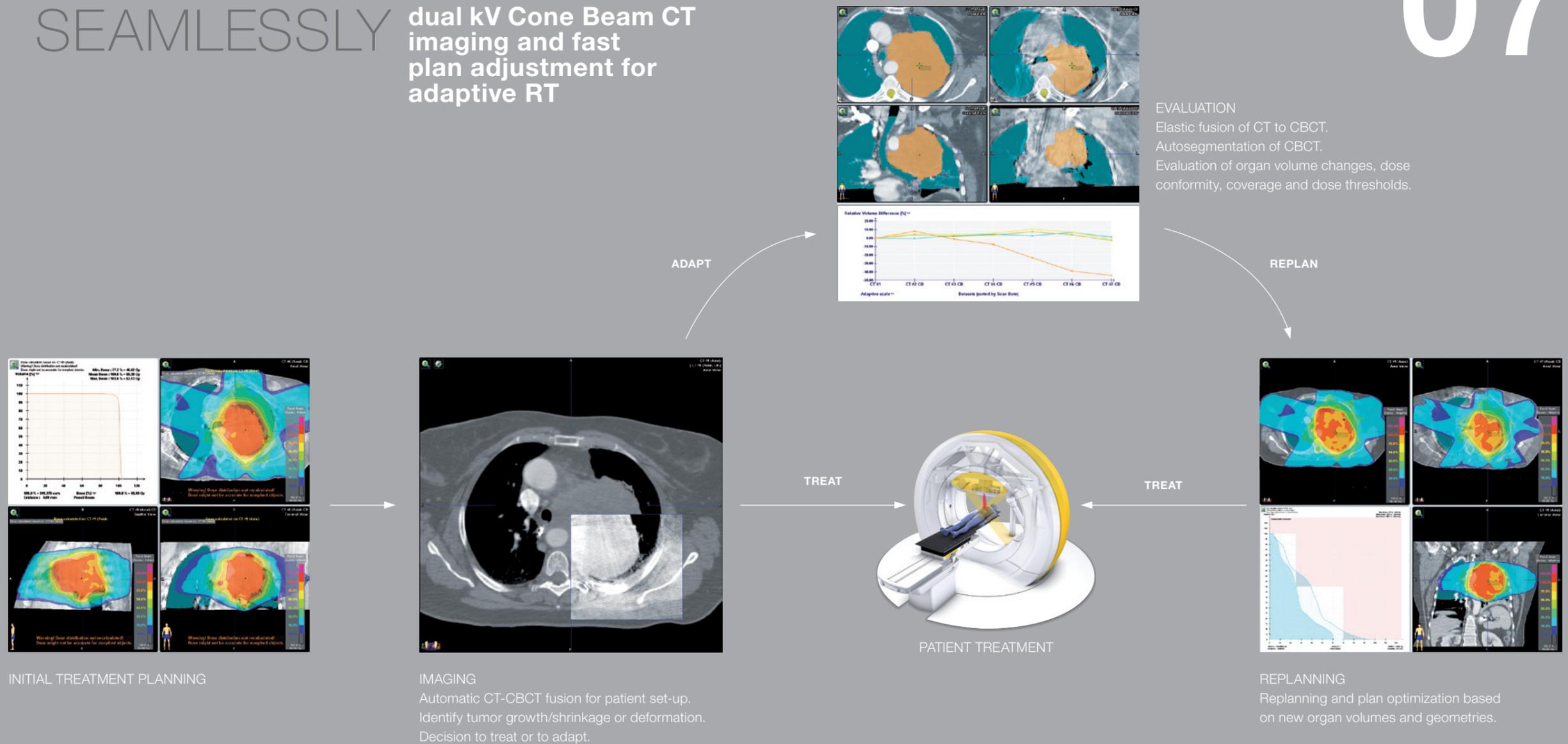
MONTE CARLO
Ideal for extracranial treatments where you experience heterogeneous tissues, Monte Carlo dose calculation offers precision planning capabilities. iPlan delivers fully integrated Monte Carlo forward and inverse planning capabilities without compromising treatment planning time.

* for comments please see page 19

ADAPT SEAMLESSLY

dual kV Cone Beam CT imaging and fast plan adjustment for adaptive RT

07



Vero provides anatomic images of high quality through its dual kV imaging systems. Take advantage of sophisticated planning capabilities for fast plan adjustment. As a platform for adaptive RT*, Vero's imaging and motion management tools are based on the real-time, ever-changing patient condition. Vero merges IMRT, VMAT, IGRT and Real-Time Tumor Tracking into one treatment delivery system, building the foundation for individualized dose delivery.

> Adjust plans quickly with the combined power of dual kV Cone Beam CT and sophisticated planning tools.

> Customize treatment to your patient's condition as often as necessary during the treatment course.

> Revolutionize dose delivery with the SBRT system that merges IMRT, VMAT, IGRT and Real-Time Tumor Tracking.

MADE FOR CHANGE

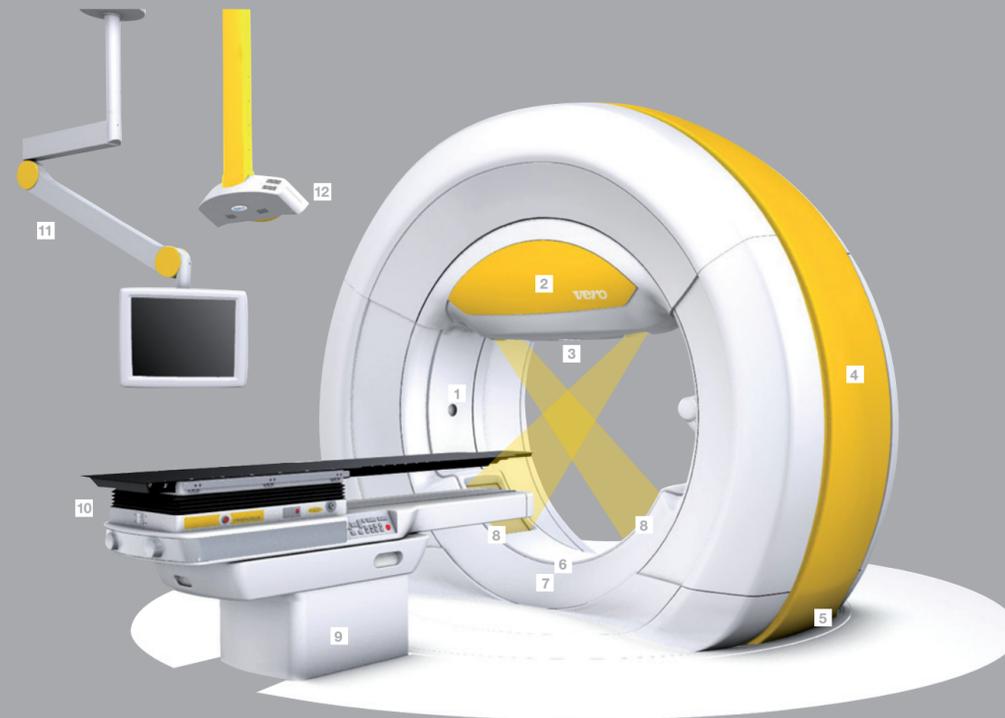
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INTUITIVE WORKFLOWS

with integration enabling on-site or remote treatment participation



iPLAN® NET



Technical Overview

- 1** Laser for semi-automatic patient pre-positioning
- 2** Gimbal mechanism for isocenter calibration and tumor chasing
- 3** Dynamic micro MLC with low leakage and high drive speed
- 4** Ring
 - > mechanically extremely stable
- 5** Ring rotation mechanism
 - > +/- 60°
 - > quick and precise switch from coplanar to non-coplanar treatments
- 6** EPID
 - Electronic Portal Imaging Device for MV x-ray imaging
- 7** Beam stopper to reduce radiation shielding requirements
- 8** Patient positioning and diagnostic imaging system „Exactrac@ Vero“
- 9** Couch
 - Freedom of motion: 5D (lateral, longitudinal, vertical, roll & pitch)
- 10** ROBOTICS
 - Allows fast robotic tilt adjustment of treatment tabletop for precise patient set-up
- 11** In-room monitor arm
- 12** Infrared real-time patient monitoring

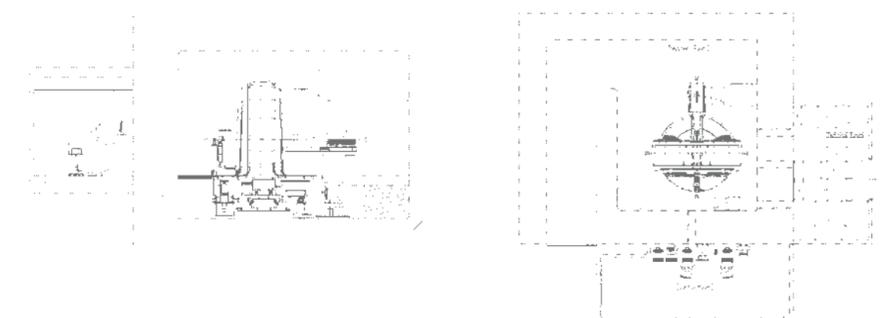
Vero's deep and broad integration drives simplicity. Vero's integration is so comprehensive that you experience an ease of handling and intuitive workflow design that even enables complete operational handling by one person. The network interface is designed for physicians to actively participate in key patient treatment steps when and where necessary, on-site or remotely. Patient positioning, treatment delivery and verification, as well as adaptive planning, are connected in a way that supports a straightforward workflow. As a consequence, treatment times may be shorter and higher patient throughput would be possible.

- > Actively participate in key patient treatment steps when and where necessary, on-site or remotely.
- > Plan treatment and position the patient seamlessly with straightforward and simplified workflows.
- > Drive shorter treatment times and higher patient throughput with Vero.

EXCELLENCE
IN INTEGRATION

The Vero system is a product of the partnership between Brainlab AG and Mitsubishi Heavy Industries Ltd. Brainlab develops the software technology including motion management and is an innovator in image-guided surgery, radiotherapy and radio-surgery. Mitsubishi Heavy Industries Ltd. develops the MHI-TM2000 linear accelerator system capable of identification of tumor location and targeting of x-ray irradiation.

* Functionality is works-in-progress and not available for sale or distribution



TECHNICAL
VAULT LAYOUT

**» WITH ITS UNIQUE,
DYNAMIC TRACKING
CAPABILITIES, COUPLED
WITH ADVANCED
REAL-TIME IMAGING
AND ABILITY TO
TREAT FROM NEARLY
ANY DIRECTION,
VERO IS THE ULTIMATE
SBRT PLATFORM. «**

TIMOTHY SOLBERG | PHD, Director of Medical Physics and Engineering
UT Southwestern Medical Center at Dallas

