ACCURAY®

CyberKnife® VSI™

versatile simple intelligent VSI™

*With the ability to offer a full range of treatment options, from radiosurgery to high precision radiation therapy, the **versatile** CyberKnife® VSI™ System provides the flexibility to optimize treatments for the unique needs of each patient*

*A comprehensive set of tools to manage every aspect of patient treatment, ready integration into existing institution infrastructure and a logical workflow make the use of the CyberKnife VSI System **simple** and convenient in daily clinical practice*

*Using **intelligent** capabilities to not only enable expert-level treatments with an intuitive planning process, but also to adapt treatment delivery to the distinct characteristics of each patient with continual image guidance, the CyberKnife VSI System instills confidence that the plan created is the plan delivered*

CyberKnife® Treatment Delivery System

Treatment targets move during treatment delivery, despite the use of immobilization devices. Using robotic mobility and continuous image guidance, the CyberKnife® Robotic Radiosurgery System both detects and corrects for that intra-fraction target motion, intelligently delivering treatments with sub-millimeter precision. With a robotic manipulator that has six degrees-of-freedom and a compact, lightweight linear accelerator, the CyberKnife System is not subject to the mobility constraints of traditional gantry architecture and can deliver beams from thousands of non-coplanar angles. The result is treatments that have excellent tumor coverage, steep dose gradients and tight dose conformality--regardless of target shape. The CyberKnife System has a proven capacity[1] for avoiding critical structures with uncompromising beam accuracy, offering world-class radiosurgery and high-precision radiation therapy anywhere in the body.

High Dose Rate for Short Treatment Times

1000 MU/min Linear Accelerator

The compact and lightweight 6MV X-band linear accelerator operates at a dose rate of 1000 MU/min, significantly reducing beam-on time. Radiation beams are precisely shaped with either fixed collimators or the Iris™ Variable Aperture Collimator. When the Xchange® Robotic Collimator Changer is installed, fixed collimators can be changed automatically – without the need for user intervention – in about a minute to meet treatment plan requirements. The Xchange table is equipped with an advanced sensory system that confirms the pointing accuracy of the robotic manipulator at the beginning of each treatment path.

The Xchange Robotic Collimator System automatically changes the secondary collimator using precision robotics.

Benefits

- Dose rate of 1000 MU/min minimizes treatment time
- Fully compatible with the Iris Variable Aperture Collimator and Xchange System

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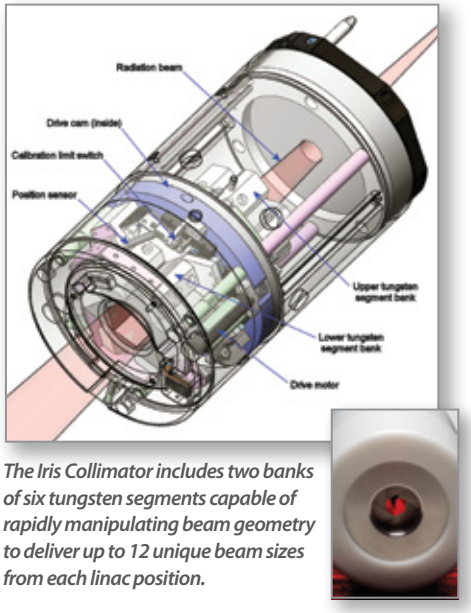
Precise Beam Collimation for Flexible Treatment Options



The Iris Collimator includes two banks of six tungsten segments capable of rapidly manipulating beam geometry to deliver up to 12 unique beam sizes from each linac position.

Iris™ Variable Aperture Collimator

Intricate dose sculpting often requires the use of multiple collimators. The Iris Variable Aperture Collimator eliminates the need to exchange fixed collimators during treatment, making multiple collimator treatments practical for routine daily use. Developed to optimize clinical workflow and improve the quality of delivered treatment plans, the Iris Collimator meets the sub-millimeter accuracy requirements of full body radiosurgery and the demands of high-precision radiation therapy.

Using tungsten segments to rapidly manipulate beam geometry, the Iris Collimator offers up to 12 aperture sizes for each linac position. Capitalizing on robotic mobility and the CyberKnife System's non-isocentric beam delivery capabilities, the Iris Collimator efficiently uses larger apertures to deliver beams to the center of the target and smaller apertures to intricately sculpt dose to the target's periphery. With beam characteristics virtually identical to that of fixed circular collimators, the Iris Collimator delivers superior dose conformality and excellent preservation of healthy tissue.[2]

Benefits
- Enables faster treatments
- Facilitates routine delivery of highly conformal, multiple collimator treatments

Advanced Patient Positioning for Comfort and Accurate Alignment

RoboCouch® Patient Positioning System and Seated Load Table Top*

The RoboCouch® Patient Positioning System is the world's most advanced patient positioning system. The intelligent robotics of the CyberKnife and RoboCouch System's combine to offer complete access to targets anywhere in the body. With a full six degrees of freedom, the RoboCouch System can automatically control anterior/posterior, superior/inferior, left/right, pitch, roll and yaw corrections — corrections required for the sub-millimeter demands of full body radiosurgery and high-precision radiation therapy. With the Seated Load Table Top option, clinicians can load patients for treatment from a comfortable seated position, making setup easier for both the clinician and the patient. And leg bolsters aren't required with the RoboCouch integrated leg support, which makes patients more comfortable throughout a treatment session. Custom designed memory foam cushions also help keep the patient calm and relaxed, which is essential for minimizing patient motion during treatment.

The RoboCouch System has a low patient loading height, ideal for patients with limited mobility.

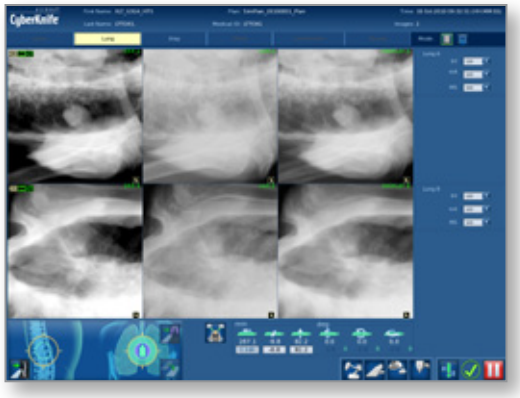
Benefits
- Increased patient comfort and reduced setup time
- Load patients in a low, chair-like position
- Supports patients up to 500 pounds (227 kilograms)
- Patient positioning in six-degrees of freedom, anterior/posterior, superior/inferior, left/right, roll, pitch and yaw

** The Seated Load Table Top is an option for the RoboCouch System.*

Treatment Simulation for Optimum Tracking Results

Simulation Application

Intra-fraction image guidance with the CyberKnife® System uses anatomical landmarks to track and automatically adjust to target motion throughout treatment. With Lung SBRT treatments, the CyberKnife System uses the image intensity of the lung tumor itself as a landmark to guide beam targeting.



The workflow in the Simulation Application helps determine the optimum tracking method for treatment of a lung lesion.

The Simulation Application, included with the Lung Optimized Treatment option, gives clinicians a logical workflow for determining the optimum tracking mode for lung treatments. The Simulation process is used to determine the visibility of the target in a set of orthogonal X-ray images. When the target is visible in two projections the Xsight® Lung Tracking System is used for treatment. If the target is visible in only one projection, the new 1-View Tracking algorithm is used. And if the target is not visible in either projection, Xsight Spine Tracking is used for alignment and an ITV is used for treatment delivery. All three tracking modes ensure each beam is precisely delivered to the target throughout the respiratory cycle, in a non-invasive manner.

Multiple Target Tracking Modes for Non-Invasive Treatments

The Treatment Delivery software provides an intuitive user interface to efficiently control all interactions between the robotic manipulator, treatment couch and imaging system. The software quickly and automatically processes live images acquired throughout treatment, calculates offsets based on Digitally Reconstructed Radiographs (DRRs) and sends offset data to the robotic manipulator for immediate and automatic motion compensation.

Continuously adapting treatment to target motion is a challenge, especially for targets that are affected by respiration or difficult to locate without fiducials. The CyberKnife System offers a growing set of options for tracking just about every type of tumor anywhere in the body — from head to spine to lung to prostate.

6D Skull Tracking System

Rendering invasive stereotactic head frames obsolete, the 6D Skull Tracking algorithm uses bony anatomy of the skull to continuously track intracranial targets and automatically correct for even the slightest translational or rotational target shift during treatment delivery.

Xsight® Spine Tracking System

The Xsight Spine Tracking System uses the bony anatomy of the spine to automatically locate and track tumors, eliminating the need for surgical implantation of fiducials and making radiosurgery in and near the spine more precise and less invasive.

Xsight Lung Tracking System

Together with the Xsight Spine System (which is used for alignment) and in concert with Synchrony® Respiratory Tracking, the Xsight Lung Tracking System directly and non-invasively tracks the movement of lung tumors with precision throughout treatment.

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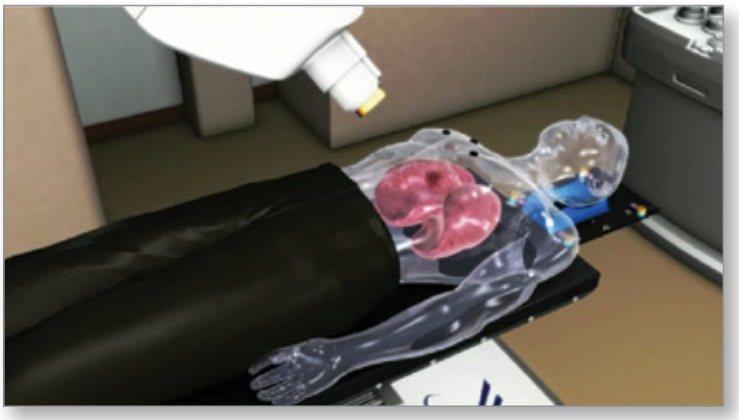
Motion Tracking Methods for Predictable and Non-Predictable Target Motion

Synchrony® Respiratory Tracking System

The Synchrony® Respiratory Motion Tracking System tracks and compensates for the predictable motion of targets in areas affected by respiration, including targets in the lung, liver, pancreas and kidneys. The system continuously synchronizes beam delivery with the motion of the target, allowing clinicians to significantly reduce margins while eliminating the need for gating or breath-holding techniques. The Synchrony System can be used with the Xsight® Lung Tracking System, with 1-View Tracking and with the Fiducial Tracking System.

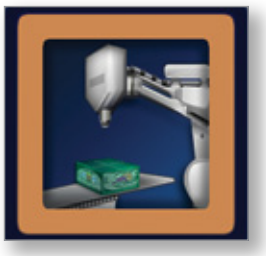


The Synchrony System is capable of tracking a wide variety of target motions, including targets that move with respiration. Changes in breathing pattern are automatically detected by the Synchrony System and compensated for in treatment delivery.

InTempo™ Adaptive Imaging System

The InTempo™ Adaptive Imaging System uses the CyberKnife System's time-based image guidance to assist with tracking and correcting non-predictable intra-fraction target motion. Targets move with time: the greater the elapsed time between image acquisitions, the greater the potential for uncorrected target shift. The InTempo System compares the offset corrections applied between every two consecutive live X-ray acquisitions. If the corrections significantly change, the time between image acquisitions (the image age) is automatically shortened to ensure updated offset corrections are applied to the next beam. The InTempo System can be used with the 6D Skull Tracking System, Xsight Spine Tracking System, and Fiducial Tracking System*.

**The InTempo System cannot be used with the Xsight Lung Tracking System or combined with the Synchrony Respiratory Motion Tracking System.*



Quality Assurance for Treatment Delivery Confidence

The accuracy of the treatment delivery system — including both dosimetric and targeting accuracy — is assured for each treatment component and for the entire CyberKnife® System. Accuray physicists work collaboratively with Quality Assurance (QA) product vendors to ensure CyberKnife QA tools are validated and CyberKnife QA procedures are documented. In addition, Accuray actively participates in industry and professional societies to ensure compliance with technical standards from around the world.

References

1. Muacevic, A., Staehler, M., Drexler, C., Wowra, B., Reiser, M., and Tonn, J. C. Technical description, phantom accuracy, and clinical feasibility for fiducial-free frameless real-time image-guided spinal radiosurgery. J Neurosurg Spine, 5[4], 303-312. 2006.
2. G G Echner, W Kilby, M Lee, E Earnst, S Sayeh, A Schlaefer, B Rhein, J R Dooley, C Lang, O Blanck, E Lessard, C R Maurer Jr and W Schlegel. The design, physical properties and clinical utility of an iris collimator for robotic radiosurgery. Phys Med Biol 54:5359–5380, 2009.

CyberKnife® VSI™ System

Robotic Manipulator and Linear Accelerator – The compact, 1000 MU/min 6MV X-band linear accelerator is capable of being positioned in virtually any direction by a high precision robotic manipulator with repeatable sub-millimeter accuracy.

Imaging System – The low-energy X-ray sources and the flush mounted detectors create high-resolution anatomical images throughout the treatment, which are continually compared to previously generated DRR's to determine real-time patient positioning and target location.

Iris™ Variable Aperture Collimator – Rapidly manipulates beam geometry to deliver up to 12 beam sizes from each linac position with characteristics virtually identical to that of fixed circular collimators.

RoboCouch® Patient Positioning System – Robotically aligns patients precisely with six degrees of freedom, enabling faster patient setup. The Seated Load option enables simple and comfortable loading of mobility-limited patients.

Xchange® Robotic Collimator Changer – Automatically exchanges collimators robotically, enabling highly conformal treatments delivered with greater efficiency.

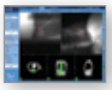
CyberKnife® Data Management System – Provides comprehensive storage and processing of the patient data that is generated as the patient progresses through the CyberKnife planning and treatment workflow.

Report Administration – The ability to review stored patient and usage data is simple and straightforward with the easy availability of a variety of departmental reports. Now available for remote review using the Report Administration web application.

Radiosurgery DICOM Interface – This interface utilizes the industry-standard DICOM protocol to export patient treatment plan and delivery information to an Oncology Information System.

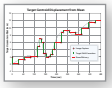
Storage Vault – Hardware for long term storage of patient records, provides approximately 10 TB of space for up to 5000 patient records. Includes automated storage of patient records based on user specified configurations.

Synchrony® Respiratory Tracking System – Continuously synchronizes beam delivery to the motion of the tumor, allowing clinicians to significantly reduce margins while eliminating the need for gating or breath-holding techniques.



Xsight® Lung Tracking System – Directly tracks the movement of lung tumors without fiducials while maintaining precision, reliability and self-adjusting repeatability.*

Xsight Spine Tracking System – Eliminates the need for surgical implantation of fiducials by using the bony anatomy of the spine to automatically locate and track tumors, making radiosurgery more precise and less invasive.

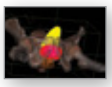


InTempo™ Adaptive Imaging System – Intelligent, adaptive imaging system designed from the ground up to address the unique challenges of prostate tracking resulting from random and excessive target motion.

Lung Optimized Treatment – Offers every lung SBRT patient a non-invasive treatment option, regardless of tumor location. Simulation and comparison workflows, combined with unique tracking modes, allow the clinician to select from multiple, non-invasive options.

Monte Carlo Dose Calculation – Often considered the gold standard for dose calculation, the CyberKnife System's Monte Carlo Dose Calculation produces results in minutes compared to what commonly requires hours or days with other systems.

Sequential Optimization – An intuitive and intelligent plan optimization algorithm for rapidly developing custom tailored treatment plans specific to the unique clinical objectives for each patient.



AutoSegmentation™ – Automatically generate accurate contours for male pelvic anatomy and for intracranial anatomy using both model-based and atlas-based delineation methods. Results can be generated using both CT and MR image information, and require minimal user input.

QuickPlan™ – A complete treatment plan is generated automatically, and the results presented to the user for review. The entire planning process, including the setting of planning parameters, optimization, and dose calculation, is automated. Plans are generated using the clinical objectives predefined by the user.

** Limited to specific tumor size and location*

For more information on the CyberKnife Robotic Radiosurgery System, please contact Accuray Incorporated.

www.accuray.com sales@accuray.com

The CyberKnife System and CyberKnife options may not be available in some countries. Specifications, features and functionality subject to change without prior notification. For a complete list of CyberKnife Systems and options available, please contact Accuray at ***sales@accuray.com.***

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Our Business Begins with Patients™

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