IMRT: Intensity Modulated Radiation Therapy

On-Target with Precision Technology

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Inspiration. Innovation. Empowerment.

On-Target with Precision Technology

Siemens: A Clear Path to the Benefits of IMRT

The promise of Intensity Modulated Radiation Therapy is as simple as it is profound. IMRT has given you the power and control necessary to maximize radiation dose to tumors while minimizing dose to surrounding tissue. IMRT continues to be a dynamic treatment advancement, as it delivers heterogeneous doses within the tumor in order to achieve a much better treatment outcome with far fewer complications to the patient. However, for many care providers, IMRT is a promise that has remained yet unfulfilled. Instead of clear answers, they see a mix of diverse technologies that seem difficult to integrate into their workflow. But a new generation of IMRT applications from Siemens has changed the scenario. Based on innovative technology and Best Practice Integration, these applications offer a clear and scalable path to IMRT for clinics of every size.

Realizing the Promise of IMRT at Every Level

Siemens has integrated a wide variety of cutting-edge technologies into a solution set that takes IMRT to a new level of efficiency and cost-effectiveness. Together they give you the ability to treat a broader range of tumors safely, more quickly than ever, and with the highest levels of automation and accuracy.

For example, Siemens 3-D MLC is fully integrated with our PRIMUS® linear accelerator to provide unrivaled flexibility for designing treatment fields. Plus, your staff can easily understand and use Siemens IMRT solutions. Products such as our PRIMEVIEW™ graphical user interface make it fast and easy to visualize, verify and record each step of every treatment, while SIMTEC® delivery systems (SIMTEC AFS, SIMTEC IMRT and SIMTEC IM-MAXX™) give you an accurate and automated way to deliver treatments to all of your patients, from routine and conformal treatments to IMRT.

For patients, the benefits are clear: safe, verifiable, accurate and efficient delivery of IMRT, with shorter treatment time, better outcomes and greater certainty for the future. For your clinic, the results are equally positive. Sophisticated automation increases throughput, broadens treatment options and raises dose accuracy — helping you to realize fast return on investment and to grow your patient base in the process.

So now, even with limited staff support, IMRT can be a reality for your clinic because Siemens makes it easy for you to implement the industry's most advanced IMRT solution.

Expanded Options for the Future

"We need to offer cutting-edge treatments to the growing number of patients who need them."

New Hope and Greater Certainty

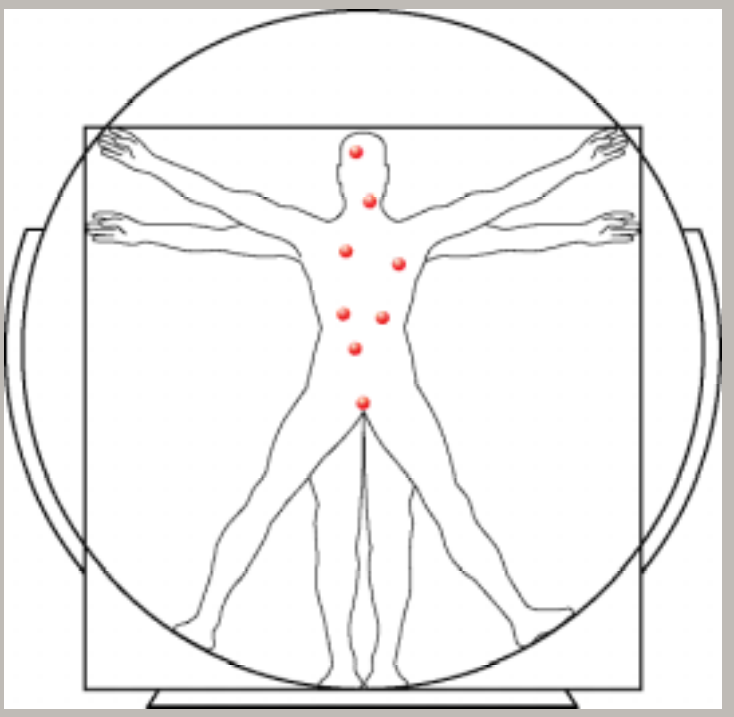
No question: The rapid advance of IMRT technology makes it possible to treat a wider range of tumor sites with far better results. Now the benefits delivered to those who suffer afflictions such as prostate cancer can be conferred to individuals with tumor sites in the head, neck, breast, liver and brain. IMRT is bringing new hope to many more patients and their referring physicians.

But when faced with rapidly changing technology, you need to be certain that your IMRT investment delivers scalability along with positive outcomes. At Siemens we understand this. So we integrate leading-edge technology with unrivaled real-world experience to offer the most advanced, reliable IMRT solutions available — and ensure that they seamlessly integrate with your workflow.

Expanding the range of treatment options for your current patient base, combined with providing cutting-edge and innovative treatments, enhances your practice capabilities while building a reputation for positive outcomes. Then add the decrease of radiotherapy side effects that accompanies IMRT, and it all translates into greater certainty and peace of mind for your patients.

Better Outcomes for You and Your Patients

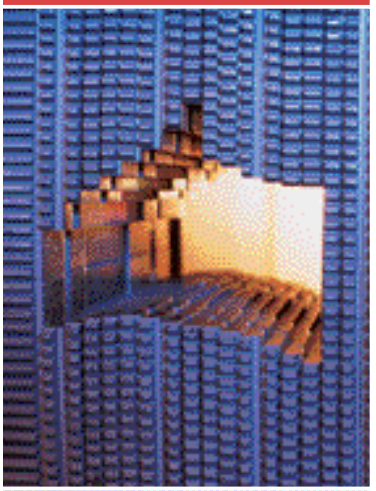
As we move towards Evidence Based Medicine, we find that health care providers will be increasingly judged on outcomes. And with Siemens IMRT solutions you can be certain that you will have the tools to create more positive outcomes for your patients. Proven in a wide range of organizations, from small community hospitals to large institutions with advanced research facilities, Siemens tools can help you realize all the benefits of IMRT. Whatever size your clinic, you can optimize utilization of new or existing equipment and grow referrals on the basis of more positive and certain outcomes.

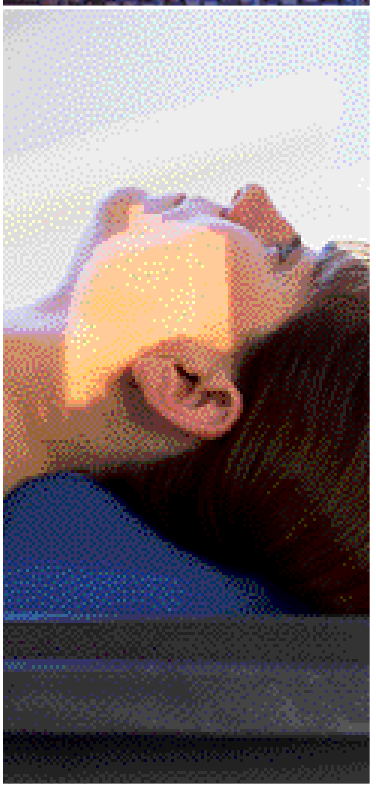


Advanced IMRT solutions from Siemens expand your range of treatment options. Capabilities include treatment of tumors in the brain, pancreas, liver, prostate, head and neck, lung, breast and para-spinal regions.

On-Target for Precision Radiation Delivery

"We need the power to precisely apply treatments near critical structures."





Maximum Benefits from More Certain Delivery

It's an ongoing dilemma for radiotherapy professionals: How can you apply maximum, tolerable radiation doses to a tumor that is near a critical structure, without drastically affecting your patient's quality of life? Precision IMRT is generally seen as the answer. Industry-wide, no one integrates leading-edge delivery technology with automated control and management systems as Siemens does.

Siemens enables you to optimize the sequential delivery of discrete field segments with an ease normally associated with standard radiation therapies. Now you can wrap and sculpt dose distributions that conform tightly to the 3-D shape of your target. Because of the minimal effect such treatments have on surrounding structures, they are able to treat high dose IMRT boosts or deliver re-treatments to areas that have already been treated and previously would have been incapable of tolerating further irradiation.

Leading-Edge Technology, Best Practice Integration

Siemens combines world-class products and Best Practice Integration to achieve the ultimate in precision IMRT delivery. Comprising this unique solution set are tools that include:

- 3-D MULTILEAF COLLIMATOR Siemens 3-D MLC is the only fully integrated system on the market today that utilizes mini-bearing technology. This innovative design ensures long life and high leaf reliability, decreasing the likelihood of leaf binding and sticking with subsequent down time. The industry's lowest interleaf leakage (less than 2%) reduces exposure to healthy tissue. Integration of the MLC with the LANTIS® Oncology Management System provides complete treatment verification and MLC download capabilities while the PRIMEVIEW graphically displays the build up of MLC shapes in gray scale images.
- IMFAST The optimal way to achieve the best possible fluence distribution and minimize treatment time for IMRT, IMFAST® Enhancement Option automatically converts RTP beam fluence maps into a sequence of enhanced MLC field shapes and beam parameters. Its optimization program minimizes the number of required treatment segments, and then arranges the order of segment delivery to minimize configuration time between segments.
- SIMTEC IMRT and SIMTEC IM-MAXX These sequencing programs each provide the mechanism for fast, accurate and verifiable delivery of IMRT. SIMTEC IMRT technology provides the automatic sequencing technology that supplies time-optimized delivery of IMRT while in a totally automated setting. SIMTEC IM-MAXX was developed specifically for the IMRT power user in order to speed complex treatment delivery and increase productivity in the IMRT environment.

Streamlining Treatment by Eliminating Repetition

"Patient welfare and increased treatment loads make fast and efficient IMRT protocols a must."

Easing Routines, Speeding Treatment

Easier on you. Easier on your patients. Better quality of life for everyone. These are the goals we pursue for IMRT. And achieving them has meant integrating and automating every stage of IMRT — bringing the benefits of smoother workflow and increased patient throughput in the process. And, Siemens offers an IMRT start-up assistance program to help you develop the physics and workflow requirements needed to effectively implement IMRT in your clinical setting.

More Time Fighting Cancer, Less Time Fighting with Technology

A common perception: "I don't want to overwhelm my department. IMRT may result in better treatment, but the increased workload, implementation costs and stress on staff just aren't worth it."

The new reality: Siemens IMRT solutions are so highly automated, safe, and easy-to-use, that complex treatments can be as straightforward to deliver as basic treatments. Open architecture and standards-based design make implementation simple. Users view and control entire treatments via an intuitive graphical user interface. Patients spend less time on the treatment table with better results.

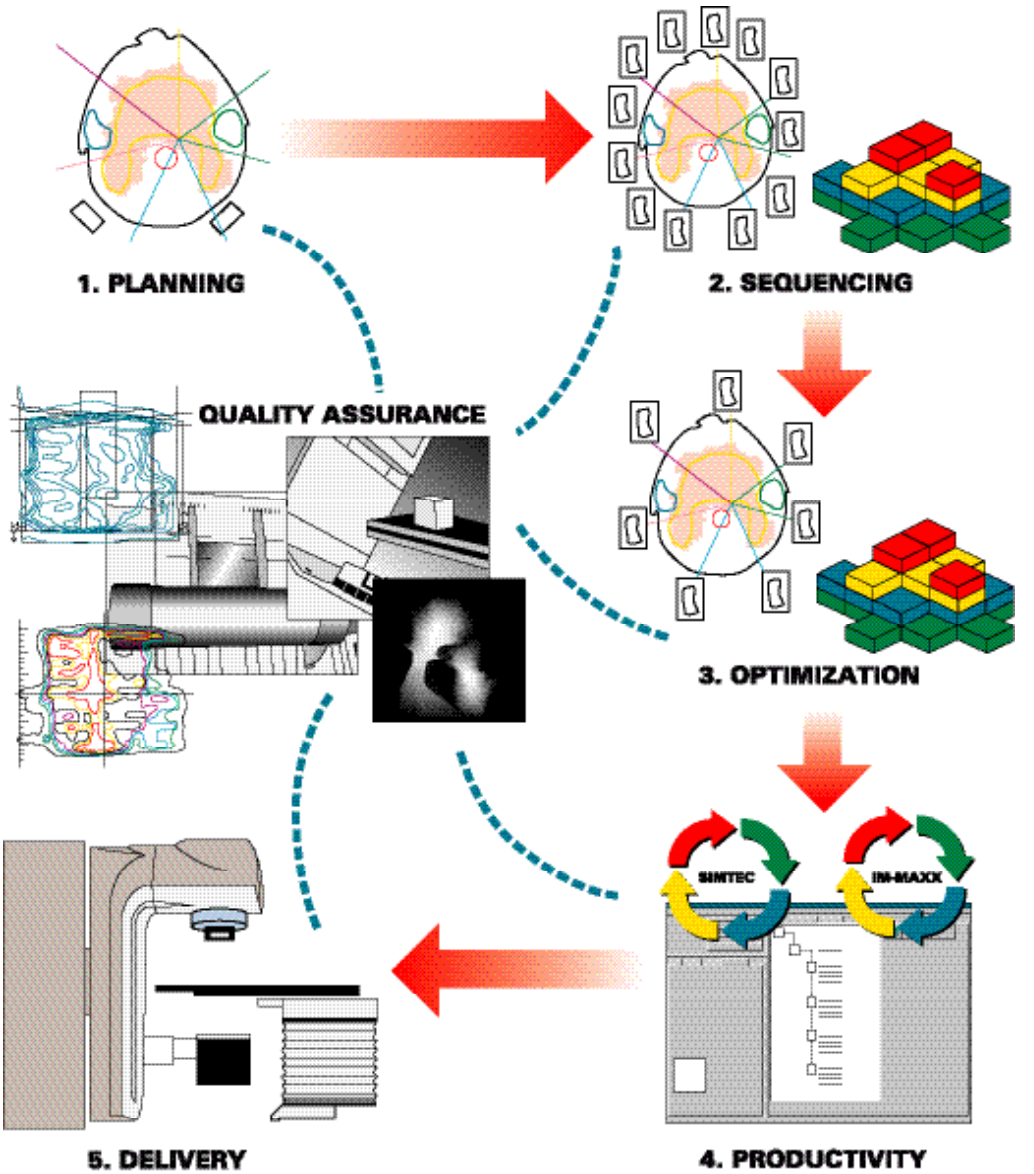
Eliminate the Repetitive Tasks of Traditional Treatment

Siemens frees therapists from the time-consuming tasks associated with traditional treatment segments. No need to manually alter a gantry position, set field size, re-shape the MLC, treat and then repeat each step again and again. Instead, automated sequential delivery makes it simple to deliver the highest possible radiation levels on target. Briefly, here's how:

- IMFAST A Siemens patented software which accounts for MLC characteristics in order to optimize beam fluence distributions and help minimize the time needed to deliver IMRT.
- LANTIS The Oncology Management System that integrates, consolidates and manages all information critical to therapy. Proven in oncology departments the world over, LANTIS stores the treatment prescriptions from your RTP System to define everything from gantry angle and MLC shape, to dosage and delivery.
- PRIMEVIEW Used to download the treatment program from LANTIS, provides a graphical representation of all treatment parameters. Making the plan understandable and verifiable at-a-glance, PRIMEVIEW then synergizes with SIMTEC, our exclusive automated delivery system. SIMTEC allows the prescribed treatment fields to proceed segment-by-segment without user intervention — adjusting gantry angle, activating the beam, etc.
- The entire treatment script is verified via PRIMEVIEW and graphically displayed in a format that is both comprehensive and understandable at a glance.

The Certain Path to Greater Productivity

Greater certainty for oncology care providers and their patients is the key benefit derived from the tight integration between Siemens superior, patented IMRT technologies. Operating as a single solution, they make the promises of better treatment outcome, safer delivery and fewer complications realizable within oncology clinics of every size. Merging seamlessly with your workflow, the Siemens approach to IMRT provides easy implementation and a scalable path to a more productive future.



Certainty that Resonates in the Voice of Our Customers

Acclaimed by industry analysts, Siemens IMRT solutions lead the industry in terms of safety, efficiency, certainty of results and patient comfort. More important for us, are the testimonies offered by our users. Because, as the key protagonists fighting in the front line against cancer, the results they achieve are the ones that really count.

"PRIMUS is a technologically advanced medical linear accelerator that incorporates SIMTEC. While the SIMTEC AFS itself automates 3D-CRT, the combination with SIMTEC IM-MAXX automates IMRT, significantly reducing the IMRT treatment time. PRIMEVIEW is a valuable real time visualization tool that pictorially allows us to follow the complex delivery processes of 3D-CRT and IMRT. With these essential components, we have implemented IMRT with relative ease. We look forward to adding another PRIMUS with SIMTEC and PRIMEVIEW in the coming weeks to expand our IMRT practice."

Cheng B. Saw, Ph.D.
Professor & Chief
Medical Physics
University of Nebraska Medical Center
Omaha, Nebraska

"Our data show IMRT may significantly reduce side effects and improve quality of life, while allowing treatments to be taken to anatomical sites where radiotherapy may not currently be indicated. Although IMRT requires additional quality assurance, the treatment process is easily integrated into the clinical routine by use of Siemens PRIMUS and PRIMEVIEW."

Dr. Dr. Jürgen Debus
Department of Radiation Oncology
German Cancer Research Institute (DKFZ)
Heidelberg, Germany

"Scripps Green Hospital/Scripps Clinic introduced IMRT to San Diego County in the summer of 2001. It has been our goal to provide our patients with the most advanced treatment techniques available.

IMRT was a natural progression from 3D conformal treatment. Using the PRIMUS linear accelerator with LANTIS the transition was relatively smooth, due in large part to our dedicated and knowledgeable staff.

IMRT is now being used on patients with prostate cancer, with head and neck and breast cancer cases to follow shortly. Our goal is to use IMRT for all curative high dose treatments as well as select palliative cases.

It is our belief that IMRT will be the only accepted standard of care in the near future. As technology changes and new more advanced treatment modalities become available, Scripps along with our technical partners at Siemens, will strive to be the front-runners in the race against cancer for the people of San Diego and surrounding communities."

Peter Pecorella
Radiation Oncology Manager
Scripps Green Hospital/Scripps Clinic
La Jolla, California

Siemens: Helping to Create a More Certain Future

Integration and collaboration are more than just contemporary themes for Siemens. Siemens worked closely with Roentgen following his discovery of X-rays in 1895 in order to develop the first X-ray tubes. Additional "firsts" in the field of medical equipment engineering have come about from the culmination of highly interactive relationships between our engineers and leading scientists of the time. This collaboration-rich history forms the basis of our technical inspiration and belief that the science of therapy delivery requires the merging of every aspect of diagnosis and treatment.

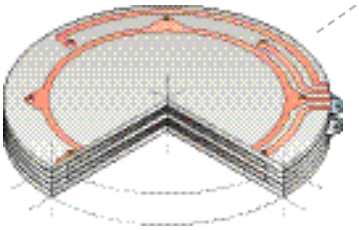
That's why Siemens approach to IMRT offers a seamless solution set encompassing everything from planning and simulation, to treatment delivery and verification. This Best Practice Integration translates to more positive outcomes for patients and higher throughput for your oncology clinic.

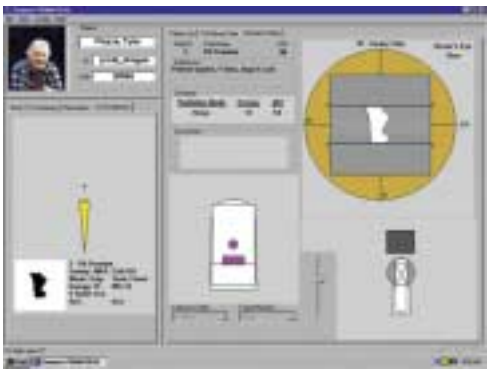
Inspiration. Innovation. Empowerment

Since the year 1986, Siemens Oncology Care has been awarded more than 60 important patents, making us the technology leader in radiotherapy. And we understand that all the innovation in the world is of value only when it provides our customers with better tools for better patient outcomes.

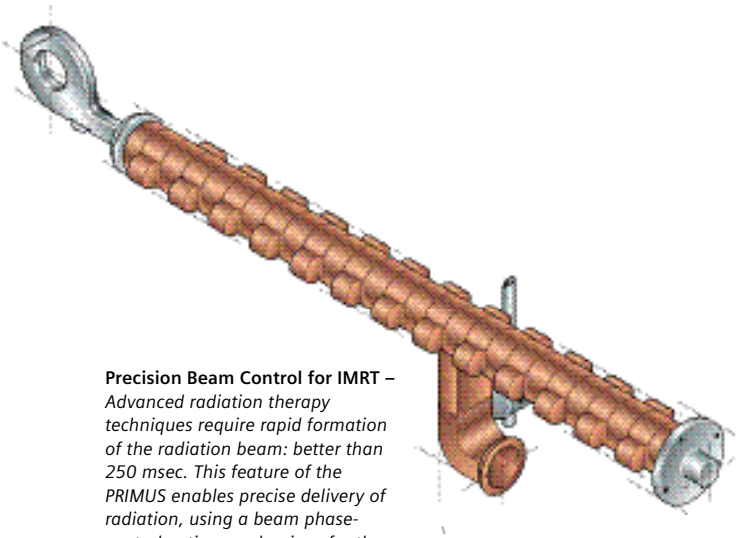
We realize such innovations form the solutions from which you and your patients can benefit. This is due, in great part, to a culture that not only encourages and rewards innovative thinking — but which also places equal value on the rapid integration of leading-edge technology into productivity-enhancing solution sets for our customers. Examples of our team's most recent accomplishments include:

Precision Dosimetry for IMRT – *The PRIMUS features the necessary technology to enable highly accurate delivery of a single monitor unit (1MU) while maintaining beam flatness and symmetry performance. This feature is very important for the accurate delivery of Intensity Modulated Radiation Therapy (IMRT) and gated applications.*



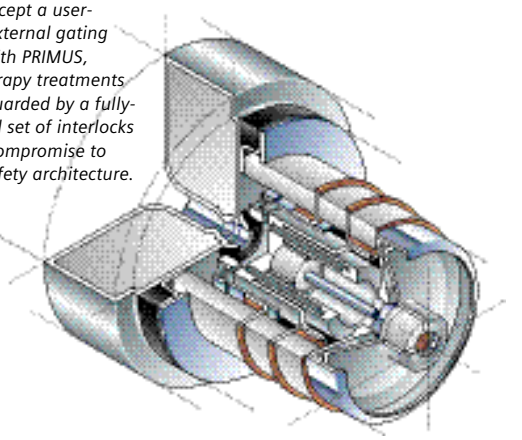


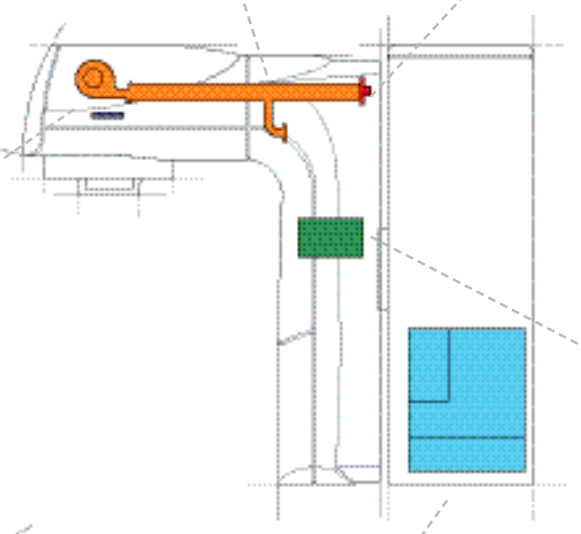
Graphical User Interface – *The PRIMEVIEW Graphical User Interface provides a state-of-the-art graphic representation of treatments. The radiation prescription is tied to each patient's demographics to enable safe, accurate and efficient verification and delivery of treatments.*



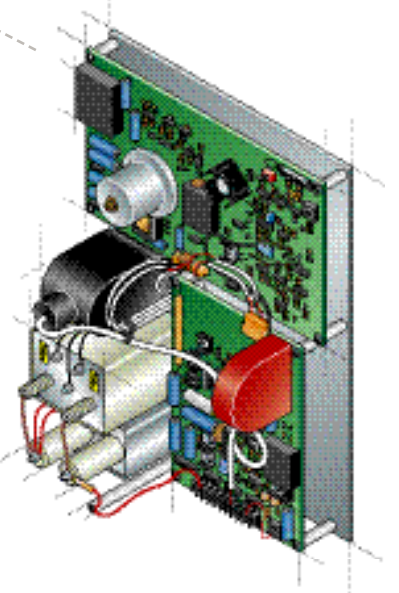
Precision Beam Control for IMRT – *Advanced radiation therapy techniques require rapid formation of the radiation beam: better than 250 msec. This feature of the PRIMUS enables precise delivery of radiation, using a beam phase-control gating mechanism, for the safe and accurate delivery of IMRT and gated treatments.*

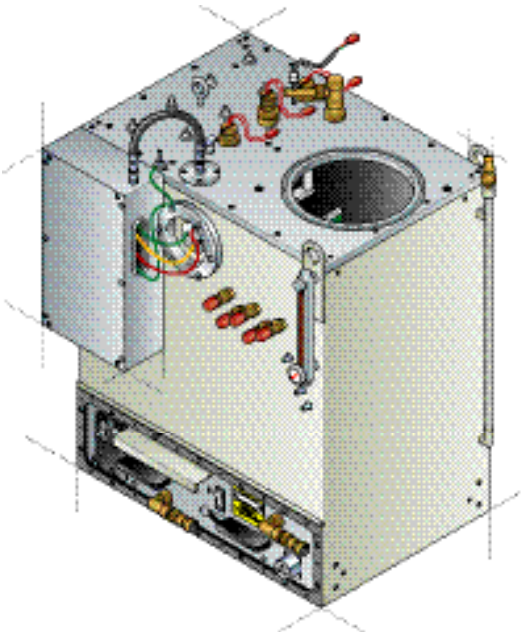
System & Method for Gated Therapy Technology – *This advanced delivery mode of the PRIMUS provides a connection port that is able to accept a user-defined external gating device. With PRIMUS, gated therapy treatments are safeguarded by a fully-integrated set of interlocks without compromise to system safety architecture.*





Method for Inhibiting Unwanted Radiation – *Patient safety and comfort were among the primary directives during the design and development of the PRIMUS. The active safety interlock hierarchy of PRIMUS includes a pre-hirate function that continuously monitors accelerator parameters to prevent high dose exposure before radiation is delivered to the patient.*





Compact Solid State Klystron Modulator – *The solid-state modulator is a key component in the compact, modular design of the PRIMUS. When introduced, this device reduced the overall size of the PRIMUS by over 70%. This represents significant savings in vault construction costs, improves serviceability and provides long-term system durability and quiet operation.*

Best Practice Integration for Intensity Modulated Radiation Therapy

Solutions That Let You Focus on Treatment — Instead of Technology

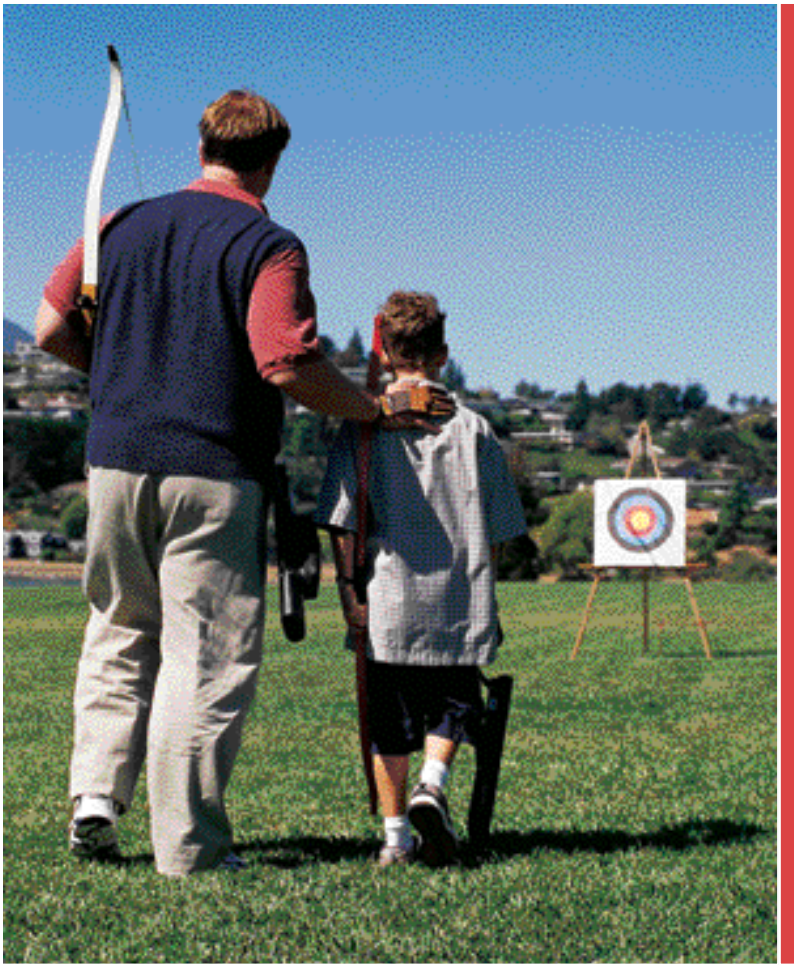
The most innovative technology in the world will be beneficial to patients only when it fits seamlessly into your workflow and streamlines treatments. This is why Siemens technology brings ease of use at every level of every solution set we offer. We provide graphical user interfaces that work the way you do — so you can focus on achieving the best results, instead of continually adjusting control parameters. Our seamless approach to integration enables you to treat a patient and simultaneously monitor progress; easily facilitate the sequencing of complex fields; and reduce treatment time and focus on treatment outcomes.

An Assured Investment for Your Future

In an age favoring rapid obsolescence, Siemens Oncology Care systems deliver long-term excellence. By bringing together the benefits of scalability and easy upgrades, we work to protect your investment in our solutions at every step of the way. We have the advantages of both a global network of Siemens modalities, and also a global network of clinical collaborators who work with us to define and implement innovation in the oncology arena.

Equally important is the Siemens reputation. In order to get you up and running with your new solution, our worldwide customer support network is available any time to ensure that you receive consistently high quality application and product information.

Today and tomorrow, Siemens Oncology Care Systems is committed to providing the highest quality clinical solutions for oncology — from prevention/screening to diagnosis and staging, followed by effective treatment delivery.



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Siemens AG Medical Solutions
Henkestrasse127, D-91052 Erlangen
Germany
Telephone: ++49 (91 31) 84-0
Internet: SiemensMedical.com/oncology

Siemens Medical Solutions USA, Inc.
Oncology Care Systems
4040 Nelson Avenue
Concord, California 94520 U.S.A.
Telephone: (800) 318-5602

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