PreScision

Stereotactic treatment solutions. Fighting cancer – fast and focused.

www.siemens.com/healthcare
Fighting cancer – fast and focused.

The philosophy behind

We are convinced that successful radiation therapy calls for the optimal resultant of speed and precision. Because speed alone at the cost of precision means to unacceptably increase the chance of affecting healthy surrounding tissue. And precision alone at the cost of speed means to lose short treatment times, high patient throughput, and a convenient patient experience out of sight.

That’s why our radiation therapy solutions aim to incorporate the optimum of both, an intelligent balance of speed and precision – to help you fight cancer fast and focused.
Hit a complex target in critical areas – precisely

Stereotactic treatment solutions for high-precision therapy – PreScision™

How can you accurately hit a complex target volume in critical areas such as arteriovenous malformation, meningiomas, acoustic neuromas, vestibular schwannoma, and intracranial metastasis? How can you minimize the risk of patient movement and damage to healthy tissue and organs at risk? And, how can you speed up treatment at the same time?

With our solutions for stereotactic radiation therapy (SRT) and radiosurgery (SRS), we master these challenging tasks – in one approach. We combine high-speed linear accelerator power – delivering a dose rate of up to 2,000 MU/min – with dedicated multileaf collimators and tailored stereotactic accessories. This complete solution provides high-precision stereotactic treatment and gives you the flexibility to do intracranial and extracranial treatments.

This all-in-one approach seamlessly turns your accelerator into the dedicated tool required for radiosurgery treatment. Accuracy and speed are the fingerprints of this innovative solution made available to address the demanding needs of hypofractionated treatments.

ARTISTE in combination with ModuLeaf is a work in progress, requires 510(k) pre-market review, and is not yet commercially available in the U.S.
The cutting-edge Siemens dedicated MLC technology enables us to improve the therapeutic ratio of treatment for patients with brain and skull base tumors by giving them high doses with greater precision and increased safety. It provides very accurate positioning of the radiation beam and very fast planning time.

Dr. Neil Burnet, M.D., Consultant Oncologist, Oncology Department at the Addenbrooke's Hospital, Cambridge, UK
PreScision for fast and focused treatment

PreScision comprises components of exceptional accuracy that work together for optimized dedicated workflows.

Focused treatments – personalized for each patient

Our ARTISTE™ Solution combines excellent imaging, patient positioning, and treatment. It comes standard with the 160 MLC™ Multileaf Collimator, composed of 160 leaves with a small resolution of 5 mm at the isocenter to provide high conformity to any complex tumor shape and position specifically adapted for body stereotactic applications. SRT and SRS are optimized using ARTISTE and ONCOR™.

• Accurate tumor shaping, minimized dose to surrounding healthy tissue
• Low leakage and optimized leaf tip for the smallest penumbra

Fast treatment – with high dose-rate and selectable energies

Available with the Multiple-X* solution, ARTISTE provides a high dose-rate of up to 2,000 MU/min and offers a combination of one flat beam and up to four selectable flattening filter free energies. Thus, you can precisely choose the right energy to accommodate your patient’s therapeutic needs. The high dose-rate will be available as “EST Mode” on ONCOR.

• Very high dose-rate of up to 2,000 MU/min
• Up to four selectable energy rates for individual therapeutic demands

Exact beam shaping – hit target volumes precisely

The fine leaf width and accurate leaf positioning of our ModuLeaf™ mMLC allow exact beam shaping for small intra- and extracranial target volumes.

• 2.5 mm leaf width over a 11.5 cm x 10 cm maximum field
• Leaf position accuracy 0.5 mm

Patient positioning – outstanding accuracy

The ability to immobilize and position the patient is critical in both SRT and SRS. Our 550 TxT™ Treatment Table – combined with the TTS table top and tailored accessories – allows for utmost precision in patient positioning, immobilization, monitoring, and treatment planning.

• Table with tight isocentric specification of ± 0.5 mm radius
• Table repositioning accuracy of ± 0.2 mm
• Table accommodates up to 550 pounds (250 kg)

* Multiple-X is work in progress, requires 510(k) pre-market review, and is not commercially available in the U.S.
Flexible all-in-one treatment solution

Our oncology treatment solutions provide great application flexibility. ARTISTE and ONCOR linear accelerators can be used for both advanced tasks such as SRS, SRT, and IMRT as well as for standard treatment procedures.

This flexibility can make your institution more attractive and maximize your systems’ utilization resulting in economical benefits.

Ready for radiosurgery in five minutes

A few simple steps is all it takes to prepare your linear accelerator for radiosurgery applications. With a motorized trolley, the dedicated ModuLeaf MLC is easily mounted onto the linac accessory holder in around five minutes.

Choose your beam shaping tool

Stereotactic cones, dedicated ModuLeaf mMLC, 160 MLC: With the right balance of field size, penumbra, and leaf width you can meet your radiosurgery needs, and still always have the freedom to use the full flexibility of the ARTISTE for every-day treatments such as 3D CRT and IMRT techniques.

High-resolution dedicated MLC for IMRT and radiosurgery

Complex or small dose distributions require a combination of small complex MLC shapes. For small field sizes output factors and thus the overall dose accuracy are extremely sensitive to leaf accuracy. That’s why the 160 MLC and the ModuLeaf with ARTISTE have the same ± 0.5 mm performance for the absolute leaf position accuracy.
PreScision – the physics behind

PreScision is the resultant of innovative components that are seamlessly integrated to provide a dedicated stereotactic treatment solution.

Radiosurgery and stereotactic treatments require precise beam shaping, small penumbra, lowest possible leakage, and a precisely positioned patient. PreScision fulfills these requirements adding a special feature to dramatically decrease the delivery time of these advanced treatments.

High-precision collimator

ModuLeaf mMLC – as dedicated add-on MLC – features 80 leaves, a leaf resolution 2.5 mm at isocenter, a maximum field size of 11.5 cm x 10 cm, and ± 0.5 mm leaf accuracy; making it an ideal device for hypofractionated treatments (see pages 8, 9).

The availability of the 160 MLC and ModuLeaf mMLC allows to tailor the beam shaping device to your application, from brain radiosurgery to body stereotactic treatment.

Flat and unflat beams

Flat and unflat beams can both be used to optimize complex IMRT treatments. With higher achievable dose rates, unflat beams become the beam of choice to efficiently reduce the delivery time of high-dose treatment sessions. Reduced head-scatter and reduced whole body leakage are also important benefits that come with flattening free beams. The unflat beams also allows for complete field coverage (max. 40 cm x 40 cm), and might be combined with flat beams for field in field or boost techniques.

Very high dose rate

Very high dose-rate of up to 2,000 MU/min drastically reduces treatment time with no compromise in terms of treatment quality. It minimizes the risk of patient movements. Higher doses allow for a lower number of fractions (hypofractionated treatment).

One flat beam and up to four unflattened beams are available with ARTISTE. *

Major effects with unflat beams:
- head scatter reduction
- decreased penumbra
- reduced whole body leakage

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Accuracy throughout the entire process

Exceptional accuracy and long-term stability together with highly efficient treatment delivery are the key to fast and focused radiosurgery and stereotactic treatment. Our components and quality assurance tools are designed to perform with the highest precision to help you optimize patient outcomes.

The overall accuracy of the dose delivery depends on the mechanical exactness of three main components: the gantry isocenter, the patient table, and the multileaf collimator. Because the overall precision is limited by the least accurate component, every single element of our solution delivers an outstandingly low deviation from the isocenter.

**ARTISTE / ONCOR linear accelerator gantry**

The maximum CAX* deviation for any gantry, collimator and table angle is confined within a sphere of 0.7 mm radius. Star shot measurements and results from Winston Lutz test show excellent results.

**ModuLeaf miniMLC and 160 MLC**

Our multileaf collimators provide high leaf positioning accuracy with a deviation of only ± 0.5 mm maximum.

<table>
<thead>
<tr>
<th>Features</th>
<th>ModuLeaf mMLC</th>
<th>160 MLC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaves</td>
<td>80</td>
<td>160</td>
</tr>
<tr>
<td>Leaf width resolution at isocenter</td>
<td>2.5 mm</td>
<td>5 mm</td>
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<tr>
<td>Max. FS</td>
<td>11.5 cm x 10 cm</td>
<td>40 cm x 40 cm</td>
</tr>
<tr>
<td>Leakage</td>
<td>&lt; 2.5%</td>
<td>&lt; 1.5%</td>
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<tr>
<td>Leaf positionig accuracy</td>
<td>± 0.5 mm</td>
<td>± 0.5 mm</td>
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<tr>
<td>Max. leaf speed</td>
<td>15 mm/s</td>
<td>40 mm/s</td>
</tr>
<tr>
<td>Interdigitation</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

* CAX Central Axis of photon beam
Stereotactic table adjustment for 550 TTxT

Non-coplanar treatments are an effective way to reach targets surrounded by complex sensitive structures. This flexibility is achieved by keeping the maximum distance of the mechanical isocenter of the whole system to the radiation isocenter to less than 1.0 mm.

ModuLeaf installation and quality assurance check

Your accelerator can be quickly turned into a high-end radiosurgery tool: It takes only a few minutes to install the ModuLeaf on the accelerator and the quality assurance protocols are performed within the next five to ten minutes.

The precision of ModuLeaf can be checked by:
- Beam alignment
- Field shape verification
- Dosimetric measurements

Partners for tailored clinical workflows

We are partnering with the major vendors in radiosurgery and stereotactic treatment in order to provide the broadest range of specialized clinical workflows to match each specific clinical needs. We combine our solution with vendors such as Integra Radionics Inc., VisionRT Inc., and BrainLab Inc. to provide tailored quality assurance tools, imaging solutions, and stereotactic accessories.

Quality assurance tools

Because stereotactic procedures involve hypofractionated treatment at high doses, the requirements for quality assurance are even more stringent than for conventional treatment techniques. Our quality assurance tools allow for the precise measurement of the components' accuracy.
Stereotactic accessories for immobilization and localization – for highest exactness

Siemens has a long and close partnership with Integra Radionics, Inc., Vision RT, Inc., and BrainLab, Inc. These partnerships result in a large selection of state-of-the-art components for stereotactic applications.

Stereotactic accessories include:
- Patient positioning and fixation
- Patient localization and target positioning
- Patient monitoring
Benefits at a glance:

**Deliver fast treatment**
- Rapid movement of multileaf collimator leaves
- High dose-rate of up to 2,000 MU/min
- Quickly modifiable accelerator to suit specific applications

**Hit the tumor precisely, save healthy tissue**
- Precise treatment of complex tumor shapes in critical areas
- Accurate tumor control
- Minimum dose to healthy tissue and organs at risk

**Provide excellent patient safety and benefits for radiosurgery and stereotactic treatment**
- Open system architecture for accessories
- High treatment efficiency
- Short patient on-table time

**Create economic value through flexibility**
- Easy, multifunctional use of accelerators for standard and advanced applications
- High system utilization and patient throughput
- New revenue opportunities through enhanced clinical spectrum
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