Precise patient positioning and real-time monitoring are vital for all Image-Guided Radiotherapy (IGRT) techniques. Modular optical positioning systems, from Varian Medical Systems, enable pinpoint accuracy of treatment delivery by ensuring reproducible, stable and accurate positioning for IGRT. Applications include intracranial radiosurgery, stereotactic body radiotherapy (SBRT), IMRT, and 3D conformal procedures.

**High-resolution optical guidance platform**

The cornerstone of Varian’s modular positioning family is the high-resolution optical guidance platform. Using optical cameras rigidly attached to the treatment room ceiling, the optical guidance platform monitors the location of unique reflective fiducial arrays to provide a real-time readout of patient displacement from the isocenter. This exceptional level of accuracy minimizes all positioning uncertainty related to the couch and lasers.

An optical guidance workstation provides the therapist with real-time feedback on patient setup accuracy. As the patient is moved into position, error bars on the workstation display become progressively shorter and change from red to green when the patient position is within specification.

The optical guidance platform is used in conjunction with specialized IGRT modules for target localization and patient immobilization to enable comprehensive treatment options including ultrasound localization, intracranial and extracranial SRS/SRT, SBRT, head and neck localization, IMRS/IMRT, and 3D conformal techniques.

**Specialized IGRT modules**

- SonArray® 3D Ultrasound Patient Positioning System
- FramelessArray™ Optically Guided Cranial SRS System
- FrameArray™ Optically Guided Cranial SRS System
- BodyArray™ Optically Guided Extracranial SRS System
Ultrasound-based guidance means accurate positioning of the target under the treatment beam.

Fast positioning and repositioning for smooth workflow.

3D image guidance with zero radiation dose.
SONARRAY 3D ULTRASOUND POSITIONING SYSTEM

The SonArray system provides fast and simple daily patient positioning for prostate and other radiation therapy targets. For facilities performing IMRT or 3D conformal procedures, the use of SonArray ensures daily accurate patient positioning prior to dose delivery. Working in concert with Varian’s high-resolution optical guidance platform, SonArray’s patented real-time 3D ultrasound localization software streamlines daily positioning procedures and improves treatment delivery accuracy.

Precise target localization

In just seconds, SonArray generates true 3D ultrasound images through the entire target volume to maximize clinical accuracy. Simultaneous axial, sagittal and coronal 3D images, complete with treatment planning contours, are compared side by side to the planning CT or treatment template. Optimized tools including touchscreen, 3D image navigation and contour shifting are used to quickly and easily determine the treatment target position and position the patient so that the internal target is precisely at isocenter.

Fast patient positioning

SonArray uses freehand optical technology to monitor in real-time the ultrasound probe, patient and linear accelerator isocenter throughout the entire radiation therapy procedure. SonArray’s streamlined user interface and customized patient templates reduce total positioning time to approximately two minutes, with unparalleled accuracy. SonArray integrates with Varian’s 4D Treatment Console enabling automatic couch integration to increase patient safety as well as positioning accuracy.
Advanced treatment delivery requires advanced patient positioning and immobilization. The Varian FramelessArray and FrameArray intracranial patient positioning and monitoring systems provide fast and simple daily patient positioning for all cranial, and head and neck treatments. These high-precision modular solutions are ideal for IMRT, 3D conformal procedures, and stereotactic radiotherapy/radiosurgery to ensure precise daily target alignment to the radiation isocenter.

Using Varian’s real-time optical guidance platform, these systems reduce patient set-up time while maximizing radiation delivery accuracy. Unlike most patient positioning systems, FramelessArray and FrameArray also provide continuous monitoring of the patient position during all phases of radiation therapy. Other Varian IGRT solutions, including On-Board Imager® kV imaging system and PortalVision™ MV imaging system, integrate seamlessly with the optical guidance platform, and can be used to acquire position verification images after optical positioning. This is especially useful in cases where changes in internal anatomy are expected during the treatment course.
Frameless optical patient positioning

Utilizing a non-invasive maxillary bite tray equipped with optical fiducial markers, the Varian FramelessArray system achieves precise, repeatable patient positioning without a rigid fixation frame. The bite tray, customized by a patient-specific impression of the upper maxillary dentition, fits securely for each treatment and enables the system to maintain precise target positioning over the entire course of treatment. Unlike standard mask or mechanical frame approaches, the optical bite tray system separates patient immobilization from patient localization, which further reduces positioning errors. Real-time patient position information is continuously monitored in six degrees of freedom, optimizing the positioning process to reduce procedure time. Highly accurate patient setup can be quickly and easily achieved for SRT, SRS/IMRS, IMRT, and 3D CRT.

Frame-based optical patient positioning

Varian’s FrameArray system uses an optically guided stereotactic fixation frame equipped with optical fiducial markers to achieve precise stereotactic patient positioning when rigid fixation is desired. Real-time patient position information is continuously monitored in six degrees of freedom, enabling SRS/IMRS procedures with sub-millimeter accuracy.

High-precision optical guidance technology

Varian’s optical guidance system provides a real-time, accurate readout of patient displacement relative to the isocenter, during initial patient setup and throughout the treatment session. Optical cameras monitor the location of the fiducial array attached to either the patient’s custom bite tray (FramelessArray) or to the stereotactic frame (FrameArray), throughout the entire treatment. In-room and control room patient monitoring with Varian’s fast and intuitive graphical interface ensure rapid setups and smooth workflow. Varian offers complete, customizable SRS systems, including FastPlan™ treatment planning, Eclipse™ integrated treatment planning, cone collimators, and Millennium™ MLC treatment delivery options.
**OPTICALLY GUIDED EXTRACRANIAL SRS SYSTEM**

The **BodyArray** optically guided extracranial system provides precise stereotactic localization for spine, lung, liver, and other targets.

BodyArray’s patient immobilization system with non-invasive stereotactic body frame, teamed with Varian’s optical guidance platform technology, provides accurate, reliable, and reproducible stereotactic positioning, and can also be seamlessly integrated with other Varian IGRT solutions like the On-Board Imager and PortalVision to further increase the precision of SBRT.

**Precise patient positioning**

Precise localization is essential for conformal treatment techniques. Varian’s BodyArray system allows the treatment planning space to be stereotactically correlated with the actual treatment space via a special external fiducial array rigidly attached to a stereotactic index board. Varian’s optical guidance platform monitors the location of the fiducial array to provide a real-time readout of patient displacement from the radiation isocenter.

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**Personalized patient care.**

The BodyArray optically guided extracranial SRS system provides precise stereotactic localization via a special external fiducial array rigidly attached to a stereotactic index board.
SEAMLESS INTEGRATION

> Seamless integration with Varian radiotherapy and treatment planning systems.

Varian’s optical positioning products seamlessly integrate with all Varian radiotherapy systems and applications for virtual simulation, treatment planning, plan verification, and remote image review and management. Varian optical positioning systems are also fully compatible with all radiation delivery devices.

VARIAN QUALITY, RELIABILITY, AND SUPPORT

> Better for the patient, better for the facility.

When you choose Varian, you choose the world’s finest oncology tools. Varian solutions can be customized to your individual needs, and provide clinicians with the freedom to make the best treatment decisions. At Varian, customer support is a lifetime commitment, and this is one of the main reasons why our support has been rated number one in the IMV ServiceTrak™ imaging survey.

SMOOTH MIGRATION PATH TO FUTURE IGRT MODALITIES

> Technology obsolescence protection.

Varian IGRT positioning systems are built with an eye toward the future and the ability to accommodate new treatment technologies. You may invest in a Varian optically guided IGRT positioning system with confidence that migration to new modalities will always be smooth and cost effective.