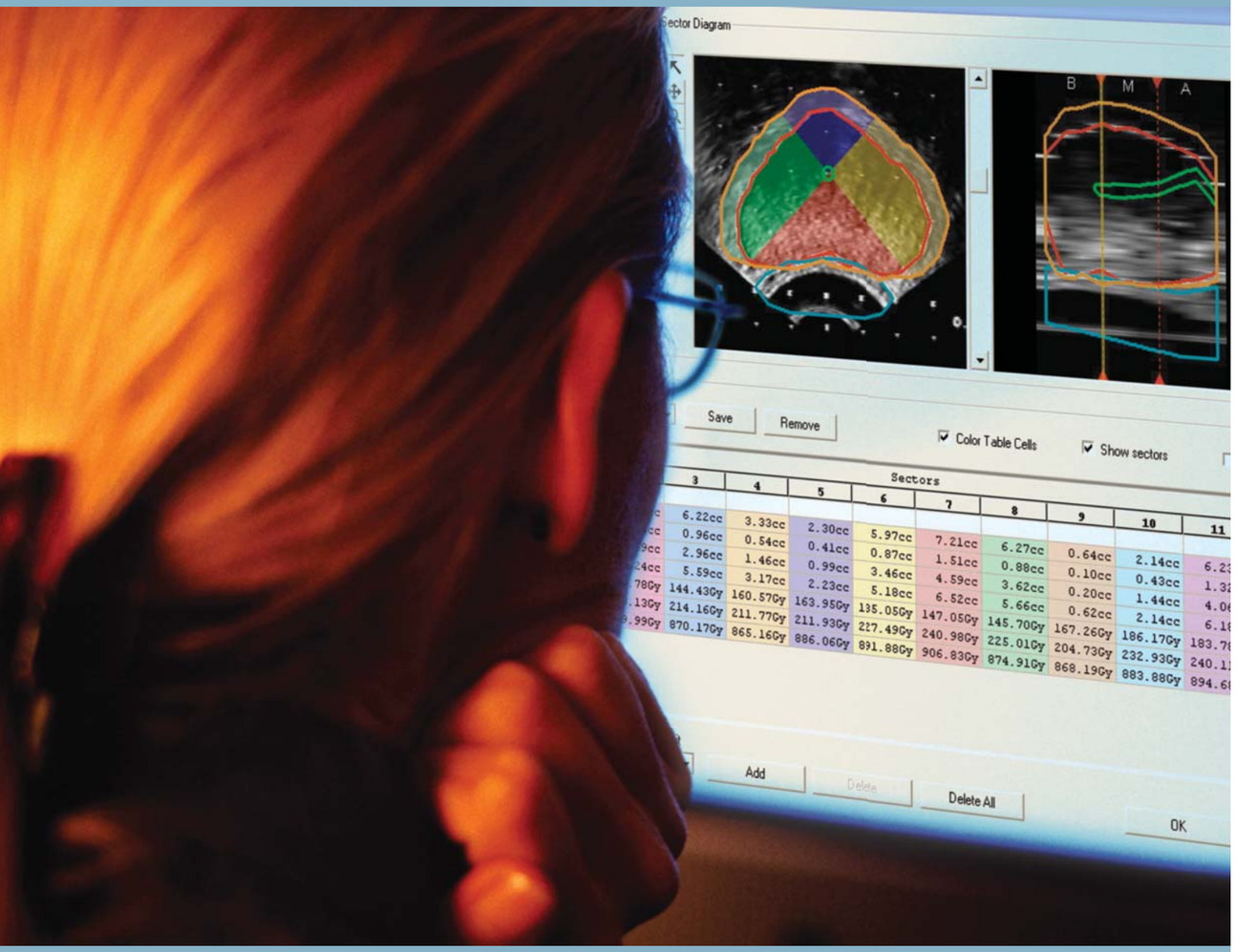
VariSeed Prostate Treatment Planning

VARIAN
medical systems



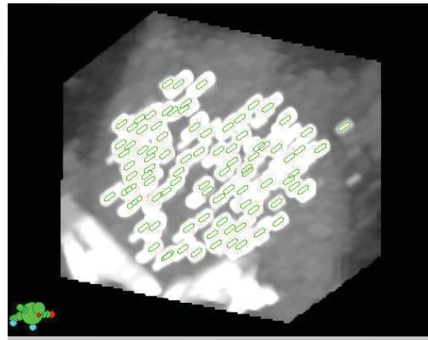
The VariSeed standard

Benchmark for prostate seed implant brachytherapy

Designed for ease of use, and configured to support all popular treatment protocols, VariSeed™ dynamic dosimetry has evolved over the past 10 years with the demands of practitioners to become the standard treatment planning system against which all others are measured. With over 1,700 systems in use throughout the world, VariSeed is the prostate brachytherapy system you can trust to meet your needs, now and in the future.

New for 8.0

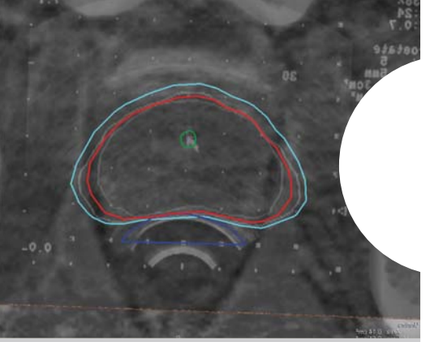
- Direct Ethernet connection to BK Medical's Pro Focus™ scanner eliminates the need to capture ultrasound data using video capture cards, improves image quality, allows contours drawn on the ultrasound to be transferred to the planning system without intervention, and automatically compensates for image zoom.
- Create, edit, and adjust contours in any plane in the three main axes with multiplanar contouring, and VariSeed will interpolate the contours to define the whole prostate.
- To contour the urethra, just point and click with the Shape Stamper – a defined size circle or triangle will be placed.
- A single line drawn along a sagittal view of the urethra can be expanded to a cylinder using the urethra sweep tool.
- Plan dosimetry can now be related to saturation biopsy sectors with the sector analysis tool for prospective or retrospective analysis.
- In addition to support for loose seeds and strands, VariSeed now supports the use of linked seeds in manual and automatic placements.
- Standard plan templates for needle and seed patterns can be saved and reused on any patient's plan.
- Maximum intensity profile and multiplanar image seed display in post planning allows precision positioning of the seed.
- Dose quality parameters have been improved allowing a dose range to be specified as well as natural dose ratios. Absolute values can also be used.
- Import and export individual source data files to further support the introduction of updated source data.



The VariSeed advantage

- Most used treatment planning system for prostate implants in the world
- 10 years of experience and improvements
- Worldwide support
- Backed by a name you can trust
- Easy and flexible to use
- Supports all major implant techniques
- Works with all ultrasound and tracked stepper units
- Source data for all available seeds
- Streamlined planning process
- Tools for new users and experienced planners
- Fast contouring
- Designed to make the transition from preplanning to dynamic intraoperative easy

A complete range of powerful tools



Fuse CT, MR, and US images with the Image Fusion option.

Outstanding features

Contouring

VariSeed supports the entry of a group of contours in any image data set. Contours can have user-assigned default names, colors, and transparency. Dynamic contour interpolation allows you to enter as many contour slices as are necessary to define the outline. It is now possible to create, edit, and adjust contours in the sagittal and coronal view as well as the transverse view with the addition of multiplanar contouring.

The sweep structure allows the urethra to be quickly generated by drawing a line along it in the sagittal view. The tool then expands the urethra to a cylinder. This is available both in contouring and implant view. Alternatively, just point and click on the urethra in the transverse view with the shape stamper – a size circle or triangle will be placed.

In addition, you can easily make a new contour from an existing one, such as a target volume from a prostate volume, with the auto-margin tool, with the margin having a unique value on each major axis.

Pre-planning flexibility

Efficient and easy to use, VariSeed provides a complete range of tools for quickly pre-planning a seed placement. Seeds can be manually placed individually or as fully loaded needles while isodose lines and dosimetric quality alerts are updated instantly. Alternatively, a plan can be created using either one of our geometric placement patterns or the optional Dose Optimization/ Inverse Planning feature. The plan may then be used as-is or quickly fine-tuned with a few manual adjustments. Once your plan is complete, you can print a needle loading report to guide the manual needle loading.

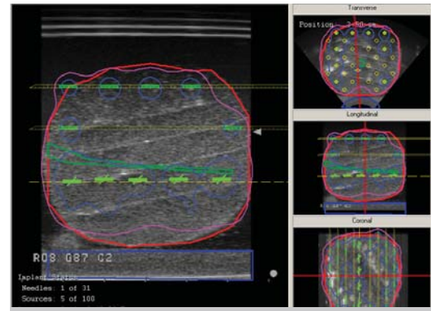
Dose Optimization/Inverse Planning

This optional feature allows placing minimum and maximum dose constraints on any structure. VariSeed finds the needle and seed loading pattern which most closely matches your criteria. In addition to loose seed, this module supports stranded and linked seeds.

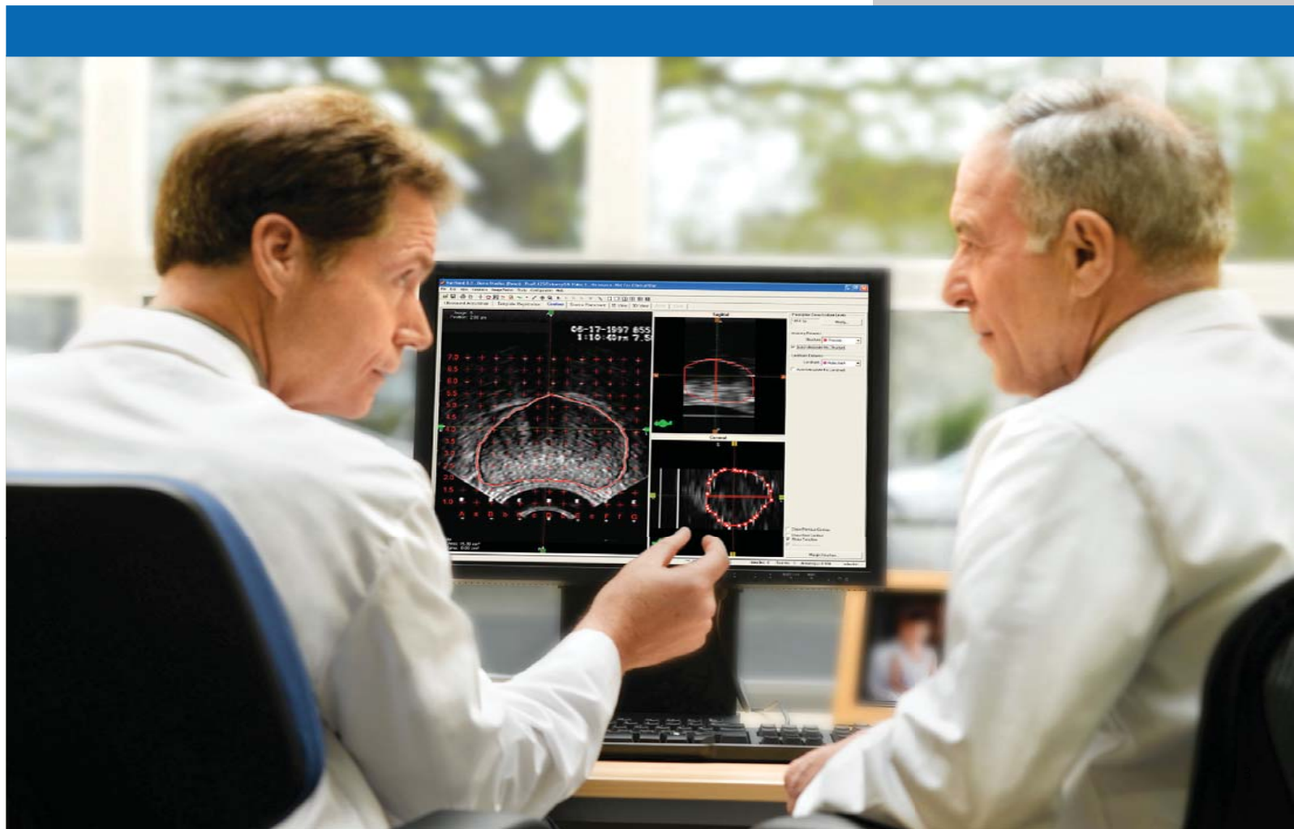
True real-time planning

With the real-time planning features of the optional Implant View VariSeed™ seed planning mode, the dose distribution can be updated directly on the live images. As the implant is being performed, it will take you from pre-plan to post-plan, one seed at a time.

Implant View can also be used to check the plan once the implant is complete, allowing additional seeds to be placed if required, or to make adjustments to the remaining non-implanted seeds during the implant process.



Using the Implant View module, the dose distribution can be updated as the implant is being performed.



Data acquisition

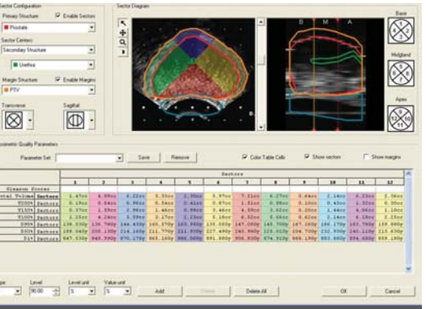
VariSeed offers three main image acquisition methods: video frame capture, digital image transfer from the Pro Focus scanner and transducer and a DICOM 3 data interface. The Pro Focus interface allows digital quality images as well as eliminating the need to calibrate the ultrasound image from within VariSeed. The Twister™ VariSeed™ 3D ultrasound acquisition module allows you to acquire target data by rotating the probe in longitudinal mode, reducing prostate distortion. (Automatic image capture requires a stepper with rotation angle feedback).

The DICOM 3 interface allows acquisition of CT, MRI, SPECT, US, or other data over a network, or from another DICOM 3-compatible source. A digitizer and scanner option is also available.

Image Fusion

The optional Image Fusion module allows multiple image sets to be fused together for visualization and contouring capabilities.

Continuing the evolution in planning



Sector Analysis allows dosimetric quality parameters to be displayed for biopsy sections of the prostate.

Longitudinal volume acquisition

When used in conjunction with a tracked stepper, VariSeed now supports the option of acquiring an image volume from the longitudinal probe of the transducer as the scan is rotated through the extents of the prostate. This new Twister option offers the advantage of reduced prostate deformation during the capture process, as compared to the standard of retracting the probe to capture the volume. Twister also provides the capability of capturing higher resolution volumes offering better visibility of structures and implanted seeds.

The right tools

Sector Analysis™ module

With Sector Analysis, VariSeed 8.0 introduces the ability to take plan analysis from whole prostate to correlation with saturation biopsies for both pre- and post-planning.

All major biopsy patterns are supported, to automatically divide the prostate into up to 12 sectors and provide dose parameters for each one. If a margin has been applied to the prostate, then the same parameters can be viewed for the margin associated with that sector.

To aid in evaluation, Gleason scores can be noted in each sector, and clear color coding makes it easy to correlate data with physical areas.

SeedFinder™ seed extraction module

Now faster and more efficient than ever, SeedFinder is designed to make post-planning a speedy process. SeedFinder automatically detects the high CT numbers in the image, and then rationalizes these centers into a 3D seed distribution. To constrain the search function, a volume of interest can be set in all three planes, or the system can be asked to only search for seeds within a defined anatomical region.

It is now possible to create, edit, and adjust contours in the sagittal and coronal view as well as the transverse.

SeedFinder is fast and effective.

Maximum Intensity Projection (MIP) seed navigator

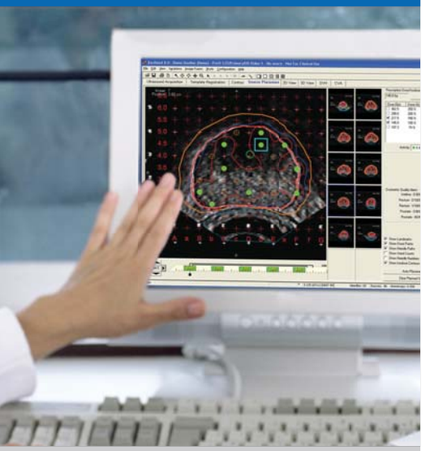
The new MIP seed navigator is a three dimensional DRR. The MIP takes the 3D CT data and windows it so that only high density objects such as the bones and seeds are visible.

This image can then be rotated in any direction and seeds selected in it. The multiplanar view will then be moved to center at the selected point, allowing precision positioning of the seed. Alternatively, use the mouse to select an area of the CT image in one of the three plane views, and a ghost pointer will indicate the same location in the DRR.

Dose calculation

VariSeed uses the TG43 dose calculation formalism, and supports anisotropic constant, factor, and function calculations. Source data is supplied for all commercially available I-125, Pd-103, and Cs-131seeds, with all data clearly defined in the Source Edit module. In this password-protected area, source data can be edited, entered, imported, and exported. It is also possible to set which sources will be available in planning. References are given for all of the sources, and a comprehensive set of tests is provided for confirming data integrity and dose calculation accuracy.

Setting the standard in brachytherapy



Needle Editor

VariSeed provides an editable longitudinal representation of the selected needle on the source placement tab. The Needle Editor allows you to directly position sources along the extent of the needle and also provides a comprehensive right-click menu for automatically loading the needle in a variety of ways, to graphically guide you through plan development faster and with better control than ever.

More advanced features

Plan Templates and Nomogram Planning

For centers that prefer a regular pattern of needles, and especially those that use standard placements, plan templates are ideal. A plan template allows needle and seed positions to be stored, and then recalled for any patient. The whole needle and seed array can then be shifted on the template to fit the patient, giving the planner a fast start to the plan.

For those that wish to use peripherally loaded implants, the Nomogram Planning module of VariSeed allows the plan to be generated rapidly and efficiently.

Once the nomograms have been entered, simply define the targets to be implanted or avoided. The system will then determine the number of seeds and needles required based on the volume and size of the prostate, with the option to alter these if required. Finally, you can adjust how tightly the peripheral and interior needles are placed.

In both cases, once the plan has been generated, changes can still be made to adjust it based on the patient's anatomy.

Plan analysis

VariSeed has a rich suite of tools to enable you to extract all the data from the plan that you require. These include interactive tools for displaying the dose at the cursor, dosimetric quality alerts in the source placement and implant views, as well as dose volume histograms and contiguous dose analysis for determining dose coverage and homogeneity. In addition, the Study Summary allows configurable dosimetric quality parameters to be printed or exported. VariSeed has a tool to meet every need.

2D and 3D views

As well as being able to view the structures and 2D dose distribution in the main source placement and intra-operative tabs, VariSeed has 2D and 3D views. These enable full evaluation of both the dose and structures at any stage in the planning process. The 3D view also has the ability to map the dose to the surface any of the existing structures. This gives the ability to easily display hot or cold spots, evaluate the dose, and assess their significance.

Cumulative, Differential, and Natural Dose Volume Histograms are available.

Plan reports

During the implant procedure, you need to be well prepared and have all the information you require easily accessible. VariSeed has an extensive range of reports from needle loading and cutting reports, to configurable plan summary and dose evaluation reports. Simply select all of the reports you need and print.

Customized prostate treatment planning systems

System configurations

Full planning systems

VariSeed planning systems are available with both standard and optional software features, so you can tailor the system to most closely match your individual needs. If you require added planning capability, additional planning stations are available at favorable pricing.

Standard features

Standard features include a fast and accurate TG-43 calculation using either point or line source approximation as indicated by the user selection of whether to use none, constant, factors or function anisotropy correction. A plan export function provides for output in delimited tables for import into word processors or spreadsheets, DICOM RT output to other planning systems such as the BrachyVision™ 3D treatment planning system or Eclipse™ treatment planning system from Varian Medical Systems, and needle loading outputs for automated needle loading devices. Additional standard features include:

- Patient database
- Frame grabber for ultrasound import
- Multiplanar contouring with dynamic interpolation
- Image enhancement
- Needle guide templates
- Needle Editor
- Manual seed placement
- Place, manipulate, and cut seeds in strands
- Place and manipulate linked seeds
- Plan Variations
- PlanTemplates
- Sector Analysis
- Pre and post planning
- Real-time dose calculation
- 2D orthogonal views
- Advanced 3D visualizations
- Differential, Cumulative, and Natural Dose Volume Histograms
- Contiguous volume analysis
- User selectable reports
- User-defined data export, including DICOM RT export
- Password-protected module that allows source entry, editing, reporting, and setting of source permissions

Special features

- Nomograms for some turnkey system providers.

Optional features

- DICOM data interface for data import
- Dose Optimization/Inverse Planning
- SeedFinder automated seed extraction module
- Image Fusion for co-registration of any two 3D data sets
- Implant View mode for real-time planning
- Twister 3D data acquisition module

Services

Installation

Systems are shipped pre-configured, so you can normally accomplish cable connections and power on without complications. Telephone support is available to help you establish interfaces to ultrasound scanners, tracked steppers, and image networks. If you elect on-site training, our applications specialist will also help you with any installation problems you may have.

Training

Application training is included with every system. Two days of classroom training, including travel and accommodation, are standard. Further training support, such as attendance at first clinical treatment can be purchased.

Other configurations

Acquisition Workstation

If you intend to acquire data in multiple locations and perform treatment planning at a central site, consider the Acquisition Workstation configuration. This product provides a reduced feature set for acquiring volume studies and contours, such as from a urology practice, or a center for which you wish to provide treatment planning services. This feature set allows for transferring that data over a network, or by removable media, to a central VariSeed planning workstation for plan preparation and analysis.

Convenience laptop

If you have a single workstation, you may wish to acquire a second to use for data acquisition at a remote site as well as parallel planning operations, and as an active spare in the event of hardware failure in the operating room. A convenience laptop system is available to licensed users at a favorable price.

Hot spare laptop

An even more economical method to ensure that a spare system is available in the event of hardware failure, a hot spare laptop is shipped with VariSeed software installed but not licensed. If needed, simply call our Help Desk and obtain a short term license to save the day!

Software only

Software licenses are available for customers who have hardware that matches our specification.

Support

We know that rapid access to great support is vital in prostate brachytherapy, so our team of physicists and dosimetrists are available via a single toll free number 20 hours a day.

Access to our experienced applications specialists to address your concerns is included with the warranty. After warranty, there are three levels of contract support available.

Platinum

Total coverage, including Gold service features, plus full hardware repair/replacement service, training credits, and guaranteed PC hardware replacement on a three-year cycle.

Gold

Includes Silver coverage plus loaner hardware to cover failed hardware components while they are being repaired. Repair costs, if not covered by manufacturer's warranty, are extra.

Silver

Help Desk support and software updates for functionality originally purchased. This is available exclusively for software-only customers.

Note: In some international markets, only Gold service is offered.

Hardware specifications

Both a laptop and tower computer configuration are available; however, most users prefer the O/R-certified laptop configuration for real-time use.

Laptop configuration

Laptop PC Intel Core Duo® processor 2.2 GHz*

2 GB RAM

120 GB hard drive

8X Max DVD+/- RW combo

32 MB graphics controller

15-inch active matrix display

Video frame grabber

Ethernet card

Microsoft® Windows operating systems

Color printer

**Tested to Medical Safety Standard IEC 601-1 (EN 60601-1-1). The laptop is classified as Type B equipment and as non-medical information technology.*

Tower PC configuration

Core 2 Duo® 1.8 GHz

1 GB RAM

160 GB hard drive

16X DVD+RW/+R

32 MB graphics controller

Video frame grabber

Ethernet card

Microsoft® Windows operating system

17-inch flat panel monitor

Color printer

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For more information on VariSeed, visit http://www.varian.com/brachytherapy.

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