



## FAST, PRECISE

Software for accurate and independent verification of monitor units, dose, and overall validity of standard, IMRT, rotational or brachytherapy plans – no film, no phantoms, no linac time required

## In **Fast, Accurate** Plan Verification The **Model** Makes the Difference

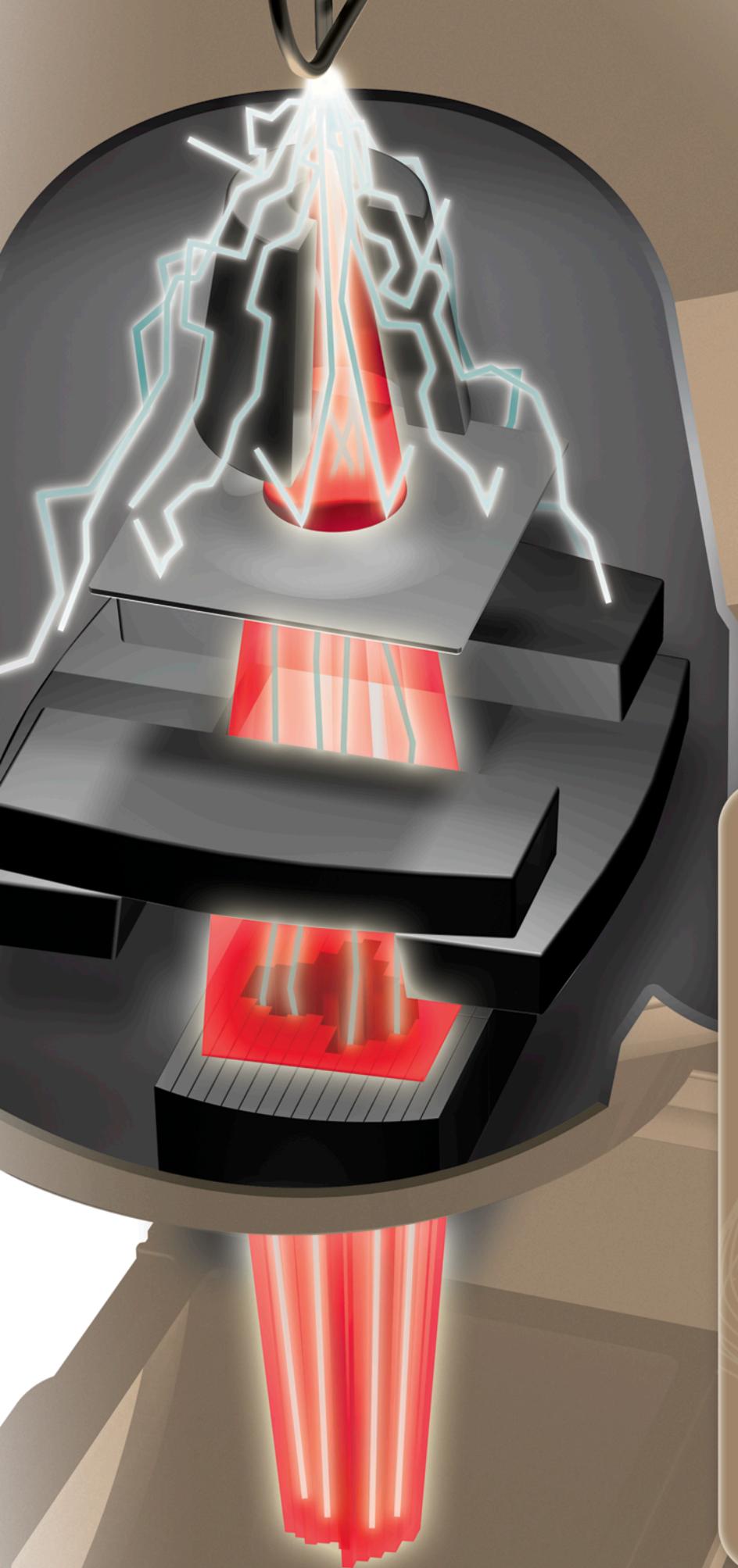
In traditional radiation therapy, 'hand-calculation' has become an accepted practice for verifying beams and doses. Though similar, the process for verifying IMRT or rotational (RapidArc™ or VMAT) delivery is much more complex. Dynamic MLC delivery creates hundreds of small fields that are extremely difficult to 'hand-calculate'. Additionally, IMRT that involves film, phantoms or other measurement devices can often take up to two hours per patient to perform.

IMSure QA Software uses algorithms, including the patented 3-Source Model, to greatly reduce the time required to conduct IMRT and rotational delivery QA, without the need for film, phantoms or linac time.

Developed at Stanford University, the 3-Source Model accurately calculates the head or collimator scatter ( $S_c$ ) contribution to linear accelerator output. This model works for any field size and shape, and for any point within the field, by accounting for:

- 1) the scatter from the primary photon source
- 2) the scatter from the flattening filter
- 3) the scatter from the main collimators

Incorporating these secondary check features into your QA processes will provide concise, confident verification of plans saved in the R&V system, while potentially helping avoid clinically significant errors.



### The **3-Source Model**

In this illustration of a linac head, the red beam represents the primary photon source and the white lines show radiation scattered by the main collimator and the flattening filter. Much of this scattered radiation stays in the head but some reaches the patient through the jaws and the multi-leaf collimator. This scattered radiation can contribute up to 12% of the dose the patient receives. IMSure QA is the only dose calculation software that uses the patented 3-Source Algorithm to accurately calculate the contribution to dose from all three of these sources.

# Easy Monitor Unit Verification

Non-IMRT plans for both photon and electron beams are easy to verify in IMSure QA.

The information you need to verify your plan is shown on a single screen. Imported information is automatically filled in or you can enter the information for each beam manually to create simple plans. Support for open beams, beams with blocks and wedged beams including the Varian Enhanced Dynamic Wedge, Elekta Omni Wedge and Siemens Virtual wedge is included.

**Simplify and automate hand calculations**

The screenshot shows the IMSure 3.3 software interface. The main window displays a calculation report for a photon beam. The report includes the following data:

Field #	1	2	3	4	5
Field ID	it med tang	it lat tang	it med 15x	it lat 15x	it med 15x PwW
Energ	6x	6x	15x	15x	15x
Block Tray	None	None	None	None	None
Wedge	30 -Out	30 -In	45 -Out	45 -In	Open Field
Wedge Dir					
Gantry Angle	56.4 deg	236.4 deg	56.4 deg	236.4 deg	56.4 deg
Collimator Angle	82.0 deg				
Table Angle	354.0 deg	6.0 deg	354.0 deg	6.0 deg	354.0 deg
Isocenter	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0
X1/Y2-Jaw (cm)	10.8 cm 8.8 cm				
Y1/Y2-Jaw (cm)	0.0 cm 11.0 cm	11.0 cm 0.0 cm	0.0 cm 11.0 cm	11.0 cm 0.0 cm	0.0 cm 10.0 cm
Eff FS(cm)	10.7	10.6	10.8	10.6	4.9
Ref Pt	it breast nom				
Dose per field (cGy)	43.1 cGy	43.6 cGy	45.3 cGy	39.7 cGy	4.2 cGy
CAX-SSD	87.6 cm	87.1 cm	87.6 cm	87.1 cm	87.6 cm
User Factor	1.000	1.000	1.000	1.000	1.000
Eq Sq (open)	14.1 cm	14.1 cm	14.1 cm	14.1 cm	13.2 cm
SurSp	1.015.1.002	1.015.1.002	1.014.1.003	1.014.1.002	1.012.0.978
InvSq corr	1.020	1.045	1.044	1.070	1.044
QAR-X/Y	1.000.1.009	1.000.1.009	1.000.1.028	1.000.1.027	1.000.1.028
TMR	0.771	0.748	0.870	0.851	0.851
T-ray Factor	1.000	1.000	1.000	1.000	1.000
Wedge Factor	0.933	0.933	0.904	0.904	1.000
TPS MU	57.1	58.2	53.3	46.8	4.5
IMSure MU	57.1	58.2	52.7	46.2	4.6
MU Diff %	0.0%	0.0%	1.1%	1.3%	-2.2%

# Advanced Features

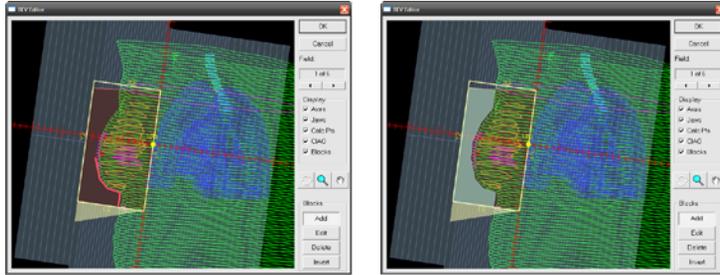
MSure QA Software includes many advanced features allowing you to streamline your plan QA.

- In-vivo measurement support – IMSure QA automatically calculates an expected reading for a diode placed at the surface in relation to the isocenter or any valid calculation point. A printable comprehensive setup report allows for easy setup and reporting of measured results
- Multiple calculation points – Import up to 30 points of interest from your treatment planning system or manually enter for more complete plan evaluation
- Block editor – An interactive block editor allows for the creation of standard or island blocks or editing of block shapes imported from your treatment planning system

The screenshot shows the IMSure 3.3 software interface with a BEV Editor window open. The BEV Editor displays a cross-sectional view of the patient's anatomy, showing the diode placement and the calculation points. The BEV Editor includes a toolbar with options such as OK, Cancel, Field, 1 of 2, Display, Axes, Jaws, Calc Pts, CAX, and Blocks. The BEV Editor also includes a list of blocks and options to Add, Edit, Delete, and Invert.

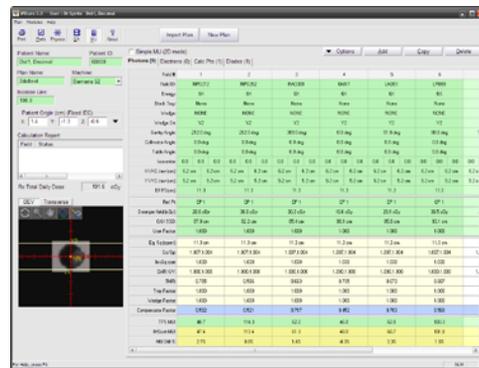
# Structures

Importing the structure set along with your plan allows for better visualization of your plan data. Utilize contours to draw blocks for tissue sparing or to account for missing tissue (flash).



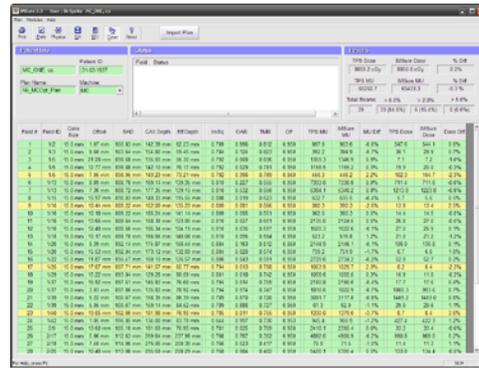
# .decimal Compensator Support

Utilizing a full convolution algorithm, IMSure models the scatter, beam hardening effects and field-size dependencies to calculate a true compensator factor for even the most complex .decimal filters.



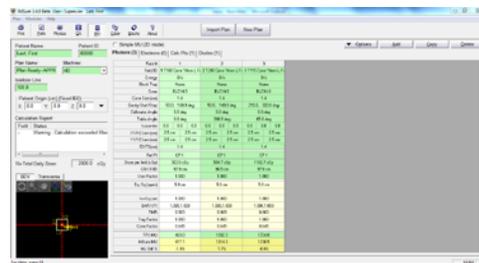
# Cyberknife Plan Verification Module

The Cyberknife module quickly and easily validates monitor units and dose for Raytrace and Monte Carlo plans created on the MultiPlan® treatment planning system. Color coding allows you to immediately recognize individual projections that are outside of user settable deviations.



# Thorough Stereotactic QA

Calculate and confirm cone-based or MLC-based stereotactic treatments, including conformal arcs. Create specific energies in physics module to accurately model small fields found in stereotactic plans.





# RapidArc Plan Calculation Simplified

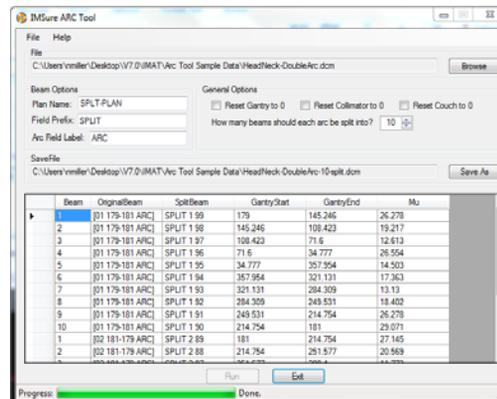
The ARC QA Tool helps limit the complex calculations associated with RapidArc plans by splitting DICOM-RT plan files into user-defined sub-arcs. The sub-arcs allow for accurate SSD and effective depth values that provide better agreement than full arc calculations.

- **Full Plan Evaluation for RapidArc**

Reset gantry, collimator and couch angles to 0, mimicking a multi-field IMRT plan, allowing for the creation of fluence maps for each sub-beam. IMSure then conducts a full evaluation of the plan, including a fluence comparison.

- **Split Plans for Measured QA**

After the gantry, collimator and couch angles are set to 0, the resulting split plan is ideal for delivering to a 2D array, EPID or film for measured QA.



- **Reimburse for Verification**

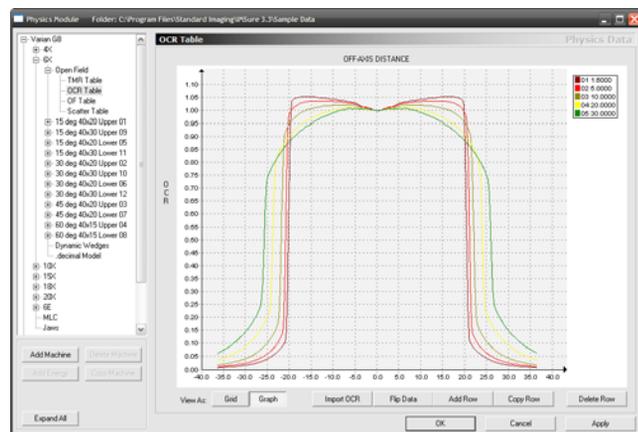
The 77300 code for basic dosimetry calculations can be billed for each field for which a calculation is performed.

# Physics is easy with IMSure QA

The Physics Interface for IMSure QA, like the rest of the software, is designed for ease-of-use. Linear accelerator data can be viewed in either tabular or graphical format in a single screen with an intuitive hierarchical design.

IMSure QA relies on your linear accelerator parameters to simulate dose delivery. Therefore, you already have the data needed to set up IMSure from the last time you commissioned your machine. For photons you need: Tissue Maximum Ratios (TMR), Off-axis Ratios (OAR), Output Factors (OF) and Head Scatter (Sc). For electrons you need: Percent Depth Dose (PDD), Off-axis Ratios (OAR) and Cone-Factors (CF).

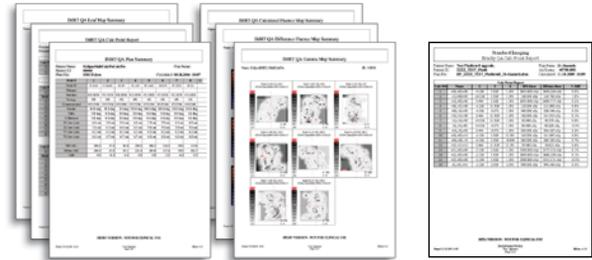
Simply set up the data in the IMSure QA format and import. A comprehensive guide and sample data sets are included to direct you in formatting your data for import. If you prefer to have your data set up for you, Standard Imaging will perform this service free for up to three linacs.



Physics Interface

# Comprehensive Report Formats

Print comprehensive reports of your calculation results for attachment to the patient record or export to a PDF file for use with electronic record keeping.



Visit [www.standardimaging.com](http://www.standardimaging.com) or call **800-261-4446** for more details.

## IMSure QA Software (REF 91326) SPECIFICATIONS

<b>OPERATING SYSTEM</b>	Windows® XP Windows Vista® Windows® 7	<b>HARD DRIVE</b>	50 MB or greater
<b>PROCESSOR</b>	Intel® or AMD®, 600 MHz or greater	<b>SCREEN RESOLUTION</b>	1024 x 768 or higher
<b>MEMORY</b>	256 MB or greater	<b>CD-ROM DRIVE</b>	2X speed or greater
		<b>PRODUCT STANDARDS</b>	Designed to meet IEC 60601-1-4 <b>CE</b>

*Windows® and Windows Vista® are registered trademarks of Microsoft Corporation. Specifications subject to change without notice.*

## MiniPhantom Detection System (REF 72195)

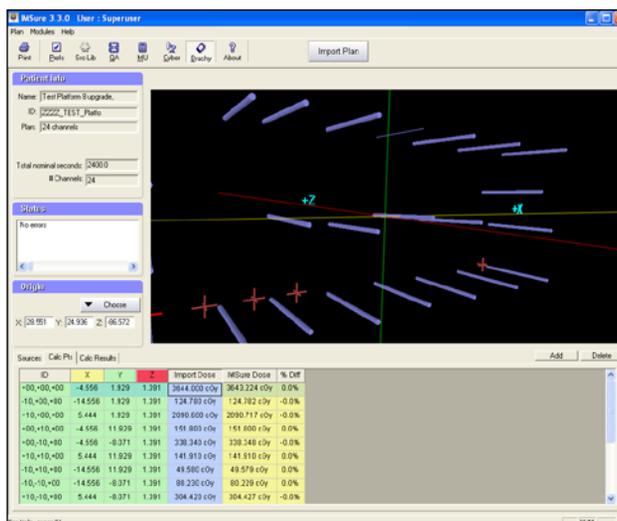
**MINIPHANTOM (REF 72194)** for the Exradin® A12 Farmer-type Ion Chamber      **MINIPHANTOM STAND/IN-AIR COMPARISON JIG (REF 72193)**

## PERFORMANCE VALIDATION

1. Y. Yang, L. Xing, J. G. Li, J. Palta, Y. Chen, Gary Luxton, A. Boyer, "Independent dosimetric calculation with inclusion of head scatter and MLC transmission for IMRT," **Med. Phys.** 30 (11), November 2003.
2. Yong Yang, Lei Xing, Arthur L. Boyer, Yixin Song, Yimin Hu, "A three-source model for the calculation of head scatter factors," **Med. Phys.** 29 (9), September 2002.
3. L. Xing, Y. Chen, G. Luxton, J. G. Li and A. L. Boyer, "Monitor unit calculation for an intensity modulated photon field by a simple scatter-summation algorithm," **Phys. Med. Biol.** 45 (2000) N1-N7.
4. Lei Xing and Jonathan G. Li, "Computer verification of fluence map for intensity modulated radiation therapy," **Med. Phys.** 27 (9), September 2000.
5. Daniel A. Low, William B. Harms, Sasa Mutic, and James A. Purdy, "A technique for the quantitative evaluation of dose distributions," **Med. Phys.** 25 (5), May 1998

## Fast, Accurate Brachytherapy Plan Checks

The Brachytherapy Module, available as an add-on component to IMSure version 3.3, imports DICOM-RT plan files from treatment planning systems and utilizes the TG-43 formalism for dose calculations (Comparison to plan is in percentage difference).

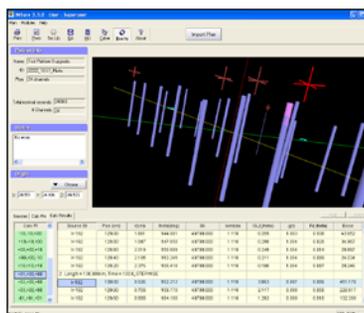


## Visualize Sources in 3D

View calculation reference points and sources, including catheters and dwell positions, in three dimensions with keyboard shortcuts for viewing orthogonal, sagittal, transverse and coronal planes.

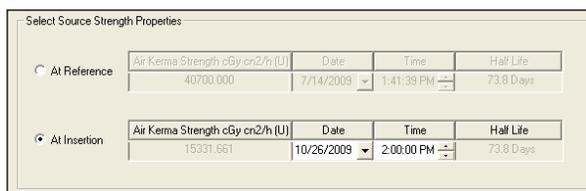
## In-depth Analysis of Each Dwell Position

Choose the calculation point and dwell position of interest and each will be highlighted in the 3D view. The dose contribution to the chosen calculation point and corresponding dwell position is shown along with the factors used in the calculation enabling easy analysis of every facet of the plan.



## Automatic Decay of Source Strength

Choose whether to calculate the dose based on the reference source strength stored in the source library or at the source strength at any date and time specified, including the time of implantation.



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