



# MatriXX<sup>Evolution</sup> System

The Solution for Rotational Treatment QA



# Rotational Therapy

Rotational therapy techniques have shifted paradigms in terms of treatment efficiency and precision.

Simultaneous modulation of gantry rotation speed, dose rate and MLC position at every gantry angle result in a highly accurate conformity of the dose delivery with greatly diminished treatment times. With these significant improvements, plans can now be tailored to each clinical case.

With this increased dynamic, the need for fast and accurate dosimetric verification of planned vs. delivered doses as well as dedicated Linac QA is evident.

**Advanced treatment techniques  
require advanced Dosimetry solutions.**

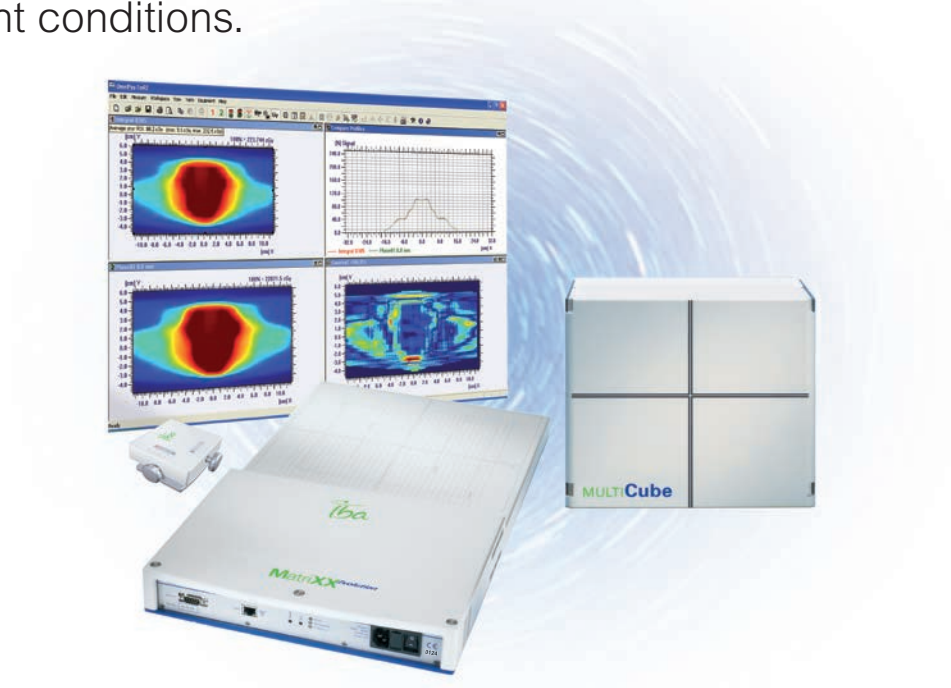
**MatriXX**<sup>Evolution</sup>

**Fastest. most Accurate. most Reliable.**

# Maximize Efficiency, Minimize Errors

## MatriXX<sup>Evolution</sup>

A faster and more accurate way to validate your RapidArc™, VMAT, Hi-Art® or conventional IMRT treatment plan under exact treatment conditions.



- Easy set-up on the patient couch.
- MatriXX<sup>Evolution</sup> digital 2D Dosimetry: faster sampling time, higher spatial resolution and low angular dependency.
- Unique Plastic Water® phantom for quick set-up and registration.
- Only one phantom needed throughout the entire process.
- Workflow driven efficiency in OmniPro-ImRT software.
- Gantry angle measurement for angular dependency optimization.

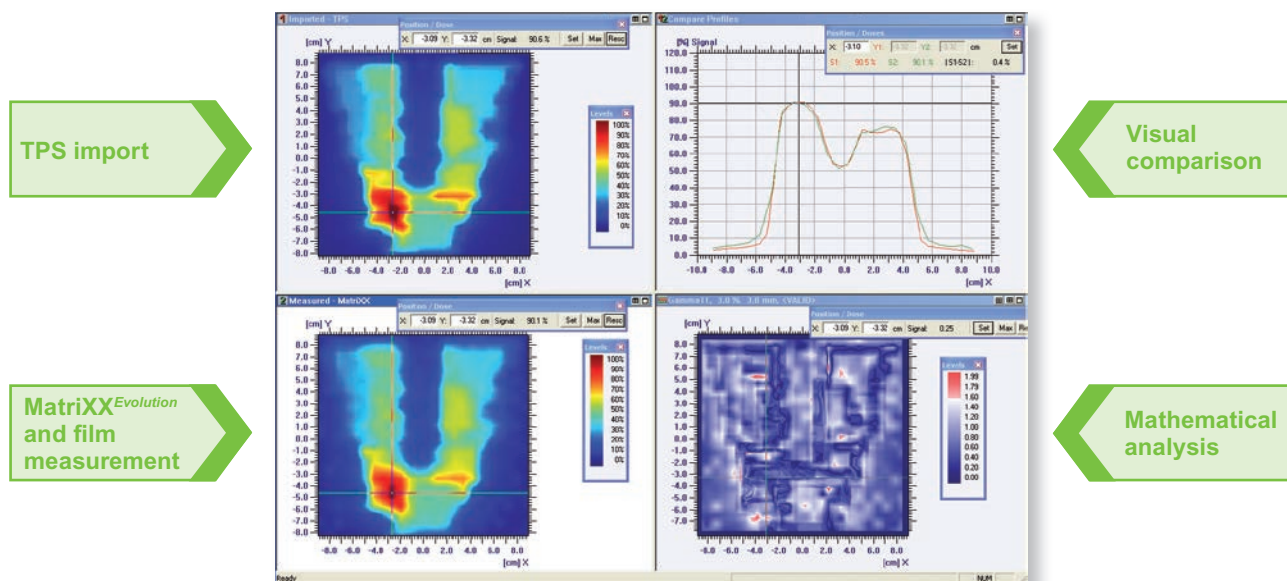
# MatriXX<sup>Evolution</sup> with OmniPro-I<sup>m</sup>RT software

MatriXX<sup>Evolution</sup> is the optimized 2D digital verification system for Rotational therapy techniques. It operates with the intuitive and user-friendly OmniPro-I<sup>m</sup>RT application software for complete plan verification and QA of IMRT / IGRT / Rotational treatments:

- Air-vented pixel ionization chambers.
- Parallel read-out of all ionization chambers without dead time. Down to 20 msec / sample.
- Highest spatial resolution: 1020 ionization chambers in an active area of 24 x 24 cm<sup>2</sup>.
- Gantry angle sensor for:
  - easy set-up on the gantry
  - easy alignment indicated by the LEDs



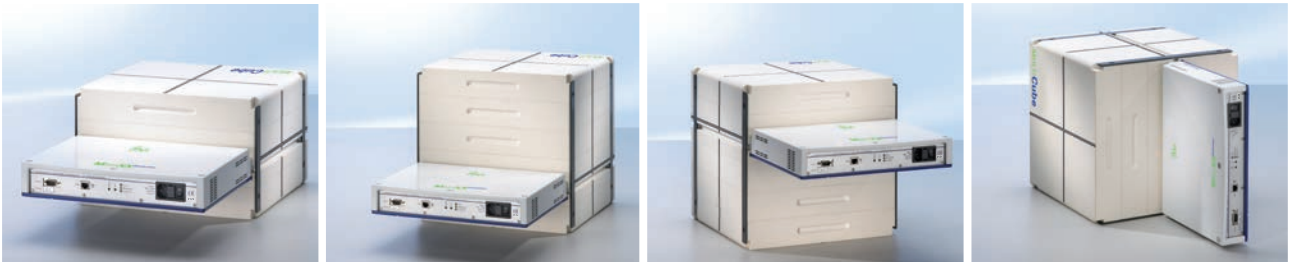
## OmniPro-I<sup>m</sup>RT software platform:



MatriXX was designed and built in cooperation with Torino University and INFN.

# One MULTICube, multiple configurations

The MULTICube provides an efficient way to validate the dose under parameters mirroring those of the patient during treatment. The flexible MULTICube combined with MatriXX<sup>Evolution</sup> and OmniPro-I'mRT software is the smart solution for all dynamic applications.



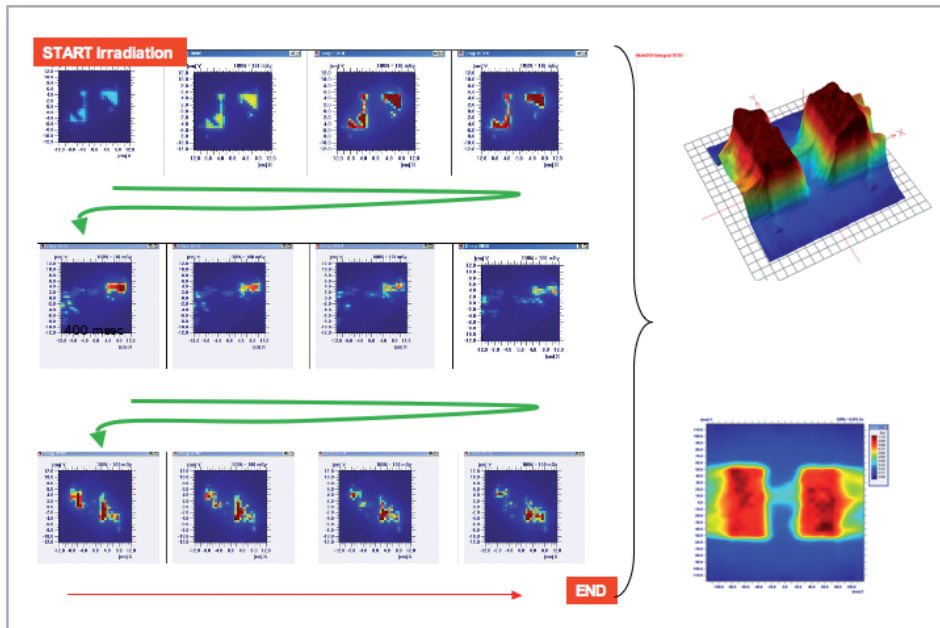
The multiple configurations in 5 cm increments allow you to physically position the measurement plane of the MatriXX<sup>Evolution</sup> at a point in the phantom material that will resemble its position in the patient. The MULTICube enables you to position the MatriXX<sup>Evolution</sup> in different depths vertically by raising the measurement plane off the couch by up to 20 cm.

Removable film cassette with registration points for independent film verification at same measurement plane as the MatriXX<sup>Evolution</sup>.



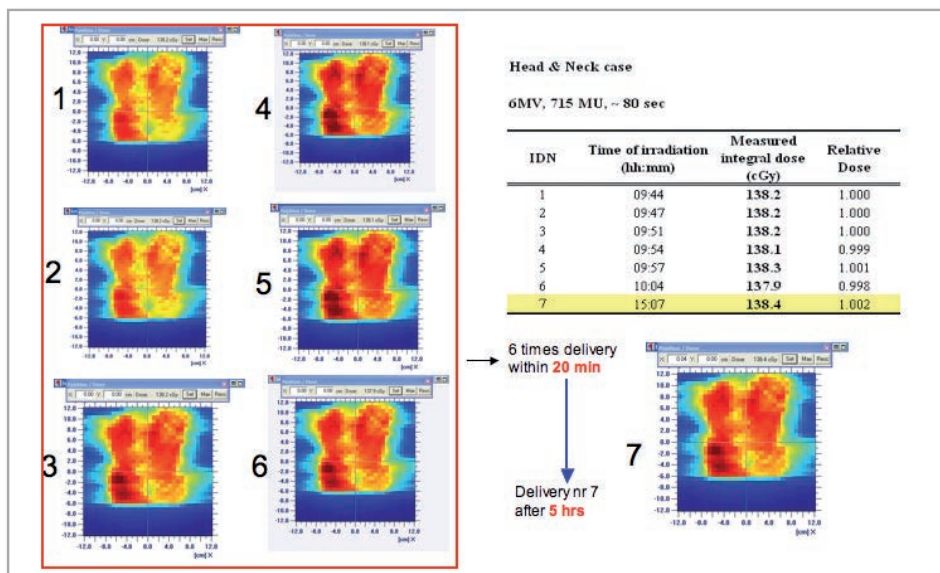
# Speed, Accuracy, Versatility

## Speed



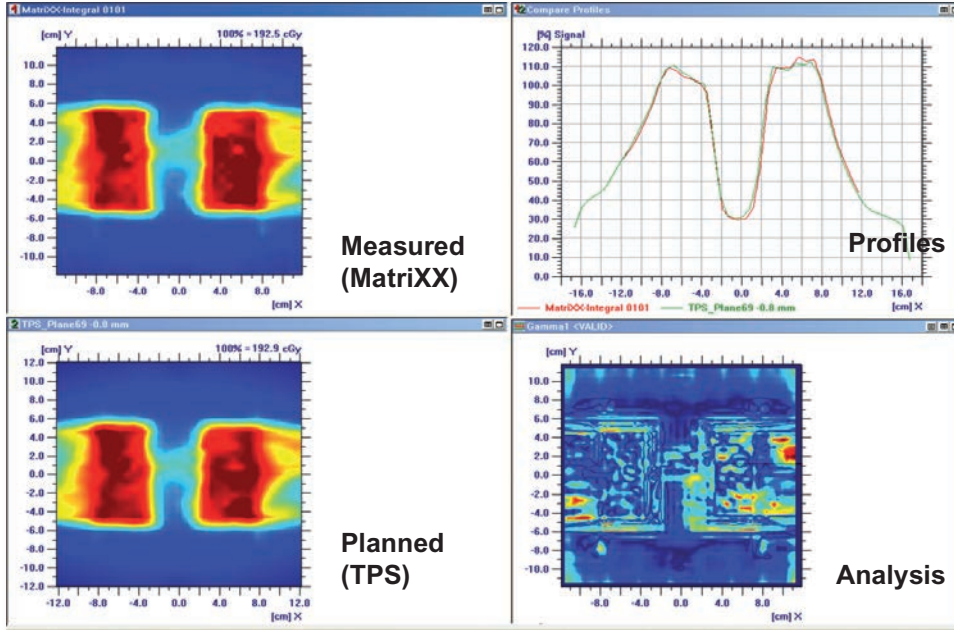
- Display of each frame as a function of the gantry angle
- Composite dose distribution measurement. Total delivery time 76 sec

## Accuracy

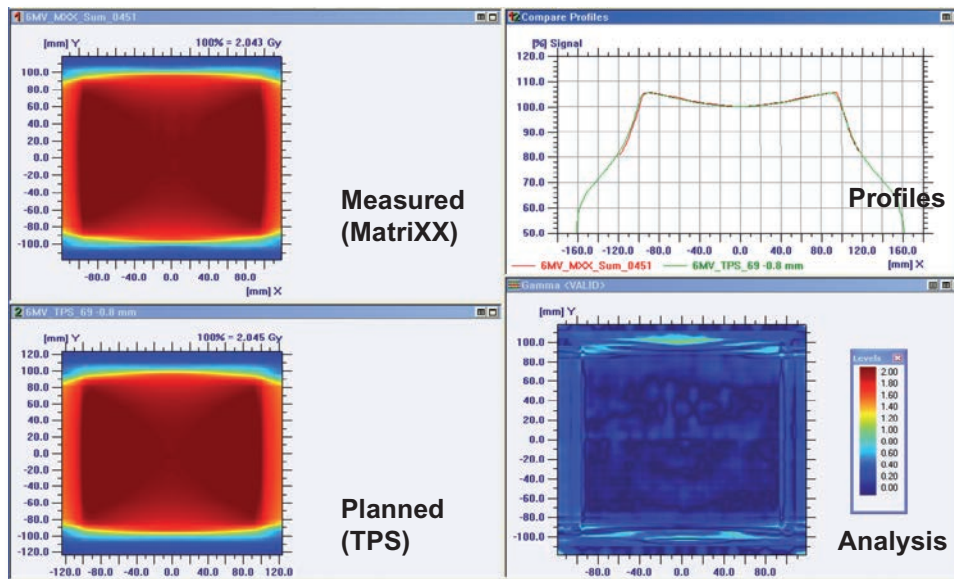


- MatriXX<sup>Evolution</sup>, high reproducibility and accuracy of measurements
- Angular dependency optimized by the gantry angle measurement

Versatility: both patient and Linac QA



► Patient QA using MatriXX<sup>Evolution</sup>

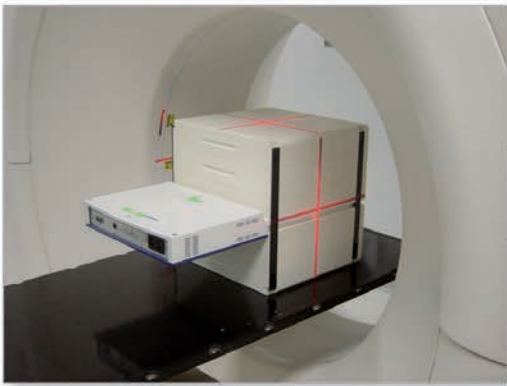


► Linac QA using MatriXX<sup>Evolution</sup>

# The Workflow

4 simple steps towards treatment

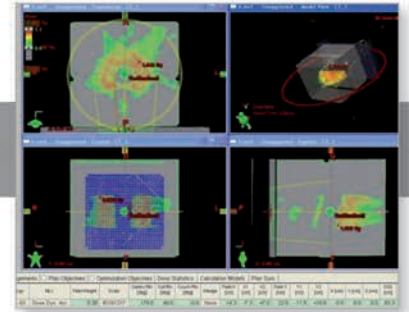
## RapidArc™, VMAT



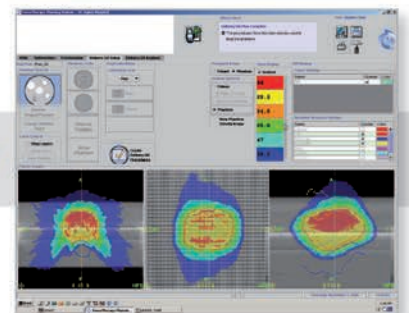
1) CT of MatriXX<sup>Evolution</sup> with MULTICube and export to TPS

## Hi-Art®

PLAN



2) Treatment plan is recalculated with chambers at isocenter distance; Dose Maps are calculated and information is exported to OmniPro-I' mRT



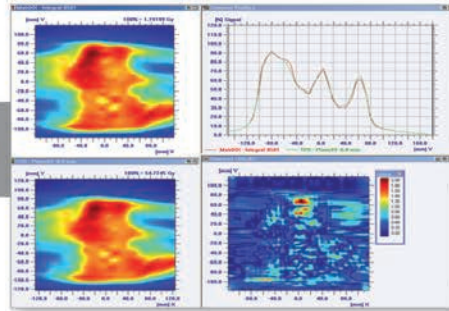
2) Treatment plan is recalculated with chambers at isocenter distance; Dose Maps are calculated and information is exported to OmniPro-I' mRT



Accept:  
Patient ready to treat



Reject:  
Further evaluation  
is needed



4) MatriXX<sup>Evolution</sup> data  
is compared to plan data using  
the palette of intuitive evaluation  
tools with OmniPro-I<sup>mRT</sup>

3) Set-up and deliver plan to  
MatriXX<sup>Evolution</sup> and  
MULTICube

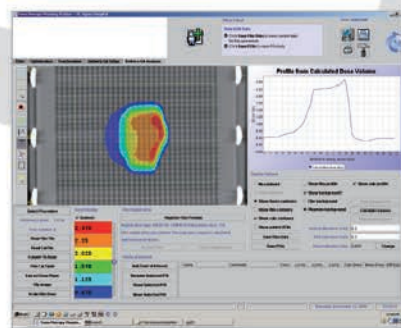
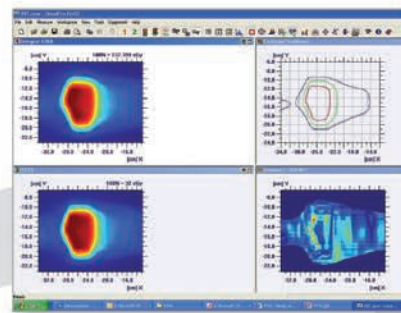


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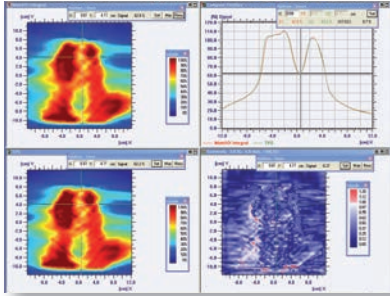
Export to DQA for analysis

3) Set-up and deliver plan  
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MULTICube



# Clinical Experiences

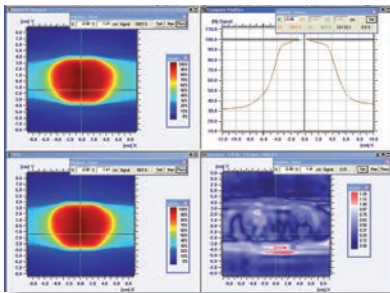
## RapidArc™



*"The introduction of a novel treatment delivery technique as RapidArc™ asks for efficient and accurate methods to verify the calculated dose distributions. At the VU University medical center of Amsterdam, the Netherlands, we choose to perform the patient specific QA in arc-based plans with both film dosimetry and with MatriXX<sup>Evolution</sup> measurements. In contrast to film measurements, MatriXX<sup>Evolution</sup> measurements are displayed instantaneously and they provide a very fast way to verify the dose calculations. With the introduction of new techniques like RapidArc™, it is important to have a fast method to measure the stability of plan delivery in time, for which the MatriXX<sup>Evolution</sup> is a suitable detector. We hope that in the future we can fully replace film measurements with MatriXX<sup>Evolution</sup> dosimetry."*

Dr. Wilko Verbakel  
Medical Physicist, Dept of Radiation Oncology  
VU University Medical Center  
De Boelelaan 1117  
NL-1081 HV Amsterdam

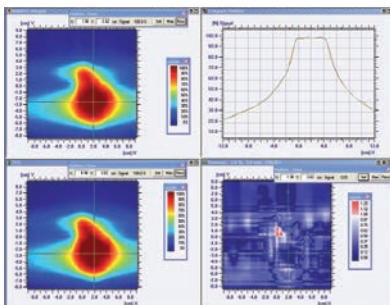
## VMAT



*"VMAT is a very fast and efficient treatment delivery technique and it is thus imperative to have a time efficient QA tool. Verification of composite treatment plans has been the preferred approach for patient specific IMRT verification at the Department of Radiotherapy, Medical University Vienna/AKH Vienna since 2000. Using a similar approach for rotational high precision RT techniques was thus obvious to us. MatriXX<sup>Evolution</sup> allows to perform QA in a very efficient manner and provides direct online and multidimensional information about dosimetric deviations."*

Assoc. Prof. Dietmar GEORG, Ph.D.  
Head, Div. Medical Radiation Physics  
Department of Radiotherapy  
Medical University Vienna / AKH Vienna  
Währinger Gürtel 18-20  
AT – 1090 Vienna

## Hi-Art®



*„We have used the MatriXX<sup>Evolution</sup> at St. Agnes Cancer Center for approximately 1 year and have found it to provide accuracy that is similar to point ion chamber measurements while also being an acceptable alternative to film for dose localization. In addition, the use of the MatriXX<sup>Evolution</sup> has reduced our IMRT plan verification times by over 50% by eliminating the extra steps of film processing and digitization, and the conversion of point ion chamber readings to obtain absolute dose."*

Timothy Holmes, PhD  
Director, Medical Physics/RSO  
St. Agnes Cancer Center  
900 Caton Ave, Baltimore, MD  
USA 21229

# Technical Specifications

## MULTICube

<b>Size MULTICube:</b>	31.4 cm (L) x 34 cm (W)) x 34 cm (H)
<b>Approximate weight:</b>	33 kg
<b>Removable film cassette:</b>	4.1 kg
<b>Material:</b>	Plastic Water® – The Original within 0.5% from 150 keV to 100 MeV of true water dose

<b>Size MULTICubeLite:</b>	31.4 cm (L) x 34 cm (W) x 22 cm (H)
<b>Approximate weight:</b>	19.8 kg
<b>Removable film cassette:</b>	4.1 kg
<b>Material:</b>	Plastic Water® – The Original within 0.5% from 150 keV to 100 MeV of true water dose

## MatriXX<sup>Evolution</sup>

<b>Number of chambers:</b>	1020
<b>Active area:</b>	24.4 x 24.4 cm <sup>2</sup>
<b>Sensor layout:</b>	matrix in a plane arranged in a 32 x 32 grid
<b>Pixel distance:</b>	7.62 mm center-to-center
<b>Chamber type:</b>	vented pixel ionization chambers
<b>Chamber size:</b>	4.5 (Ø) x 5 (h) mm, chamber volume 0.08 cm <sup>3</sup>
<b>Typical sensitivity:</b>	0.42 nC/Gy / 2.4 nC/Gy
<b>Effective point of measurement:</b>	3 mm from surface
<b>Accuracy of angle sensor:</b>	+/- 0.6°

## Minimum computer requirements (OmniPro-I<sup>m</sup>RT)

<b>Operating system:</b>	Microsoft® Windows® (XP, VISTA™* 32-bit)
<b>Processor:</b>	Pentium (or equivalent), 1.8 GHz or better
<b>Memory (RAM):</b>	2 GB
<b>Hard disk:</b>	with at least 160 MB available, recommended 40 GB for data archiving
<b>Monitor and graphics:</b>	supporting a resolution of 1024 x 768 pixel at True Colour (32-bit)
<b>Ports:</b>	available Ethernet connection (RJ-45 for I <sup>m</sup> RT MatriXX) interface to film scanner, USB 2.0
<b>Import of planned data:</b>	CadPlan (dose / fluence), CMS (dose / fluence), BrainLAB (dose / fluence), Plato (dose), Pinnacle (fluence) and from all TPS that support DICOM RT or RTOG formats, Tomotherapy (ASCII dose)

Technical data is subject to change without prior notice.

TomoTherapy® and TomoTherapy® Hi-Art® are trademarks of TomoTherapy  
 Plastic Water® is a trademark of CIRS  
 RapidArc™ is a trademark of Varian Medical Systems Inc.

\* Some accessories might not be Microsoft® Windows® Vista™ compatible (e.g. Film scanner)

# IBA in a Nutshell

IBA offers innovative high-quality solutions and services with a focus on patient safety in cancer diagnosis and therapy.

## Medical Imaging: Safer Imaging, Earlier Cancer Detection

- Innovative Quality Assurance (QA) devices for x-ray dose and image quality checks, as well as QA of diagnostic displays
- Patient dose monitoring solutions for x-ray imaging systems

## Radiation Therapy: Fighting Cancer Safely and Precisely

- Industry-leading dosimetry and QA solutions that maximize efficiency and minimize errors for better outcomes
- Flexible soft tissue imaging markers (VISICOIL™) enable precise tumor targeting and tracking for pinpoint RT, IGRT and SBRT treatment accuracy and patient safety
- Undisputed leader in Proton Therapy delivery systems: Providing highly precise and effective radiation therapy

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