



MatriXX^{Evolution} 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 this 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^{Evolution} – **FAST**_{est} | _{most} **ACCURATE** | _{most} **RELIABLE**

Maximize efficiency, minimize errors

MatriXX^{Evolution}

The fastest and most 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^{Evolution} digital 2D Dosimetry: fastest sampling time, highest spatial resolution and lowest 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.

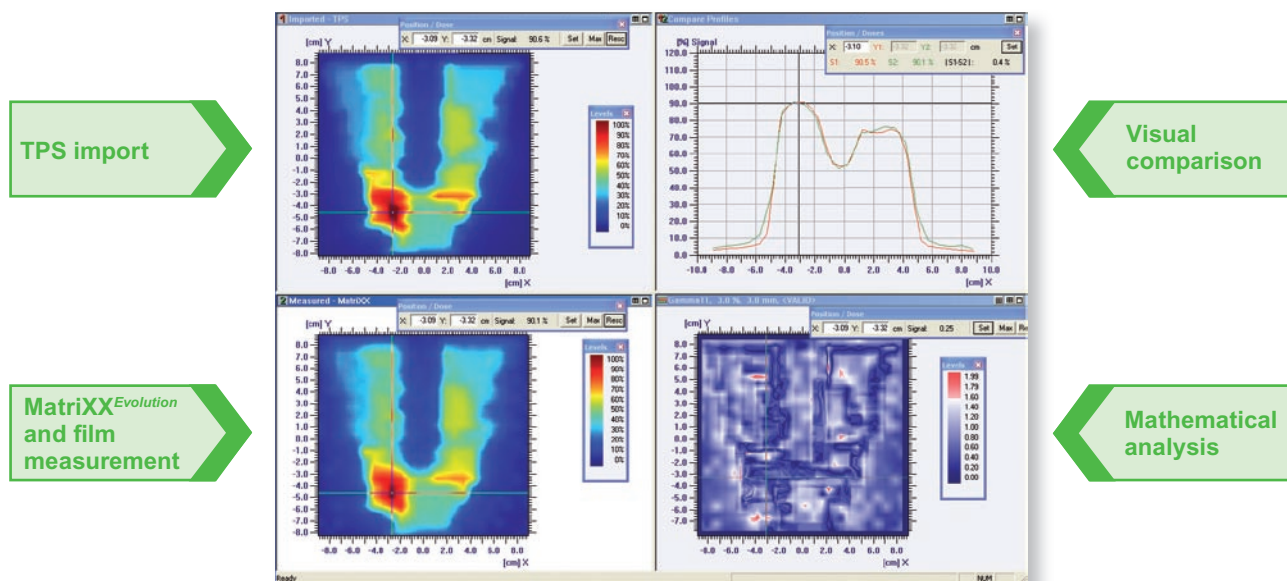
MatriXX^{Evolution} with OmniPro-I^mRT software

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

- Air-vented pixel ionization chambers (~ 10 %).
- 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 cm².
- Gantry angle sensor for:
 - easy set-up on the gantry
 - easy alignment indicated by the LEDs



OmniPro-I^mRT 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 new MULTICube combined with MatriXX^{Evolution} and OmniPro-I'mRT software is the smart solution for all dynamic applications.



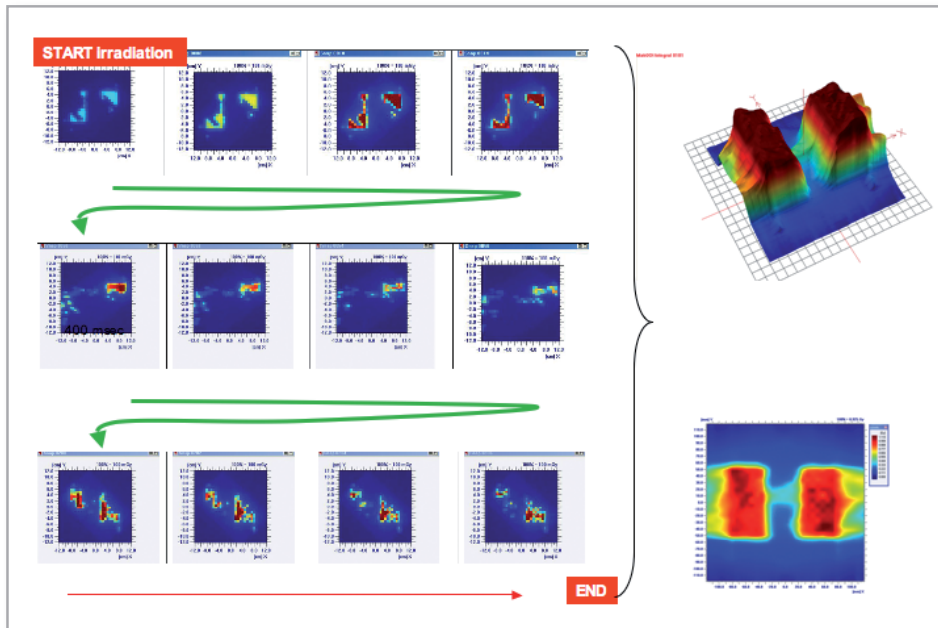
The multiple configurations in 5 cm increments allow you to physically position the measurement plane of the MatriXX^{Evolution} at a point in the phantom material that will resemble its position in the patient. The MULTICube enables you to position the MatriXX^{Evolution} in different depths vertically 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^{Evolution}.



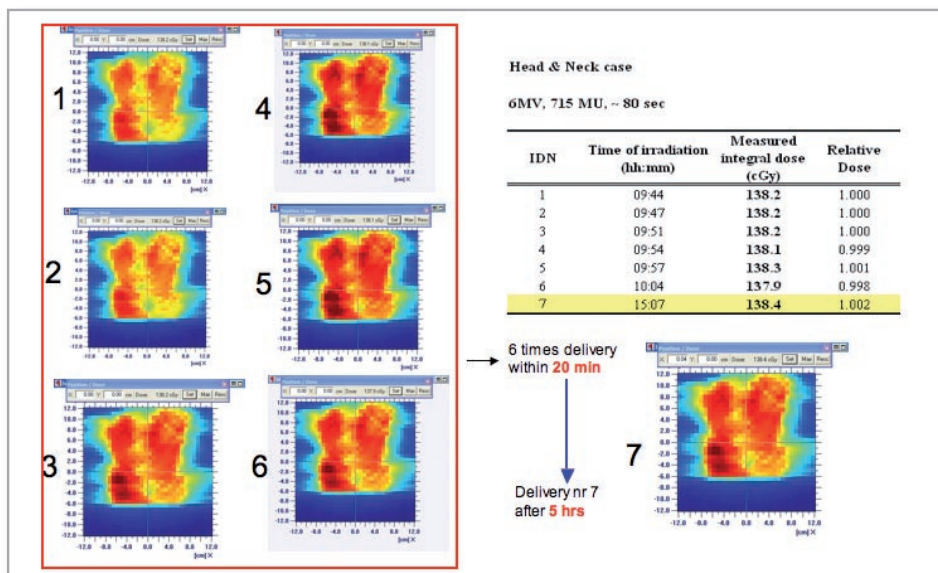
Speed, Accuracy, Versatility

Speed



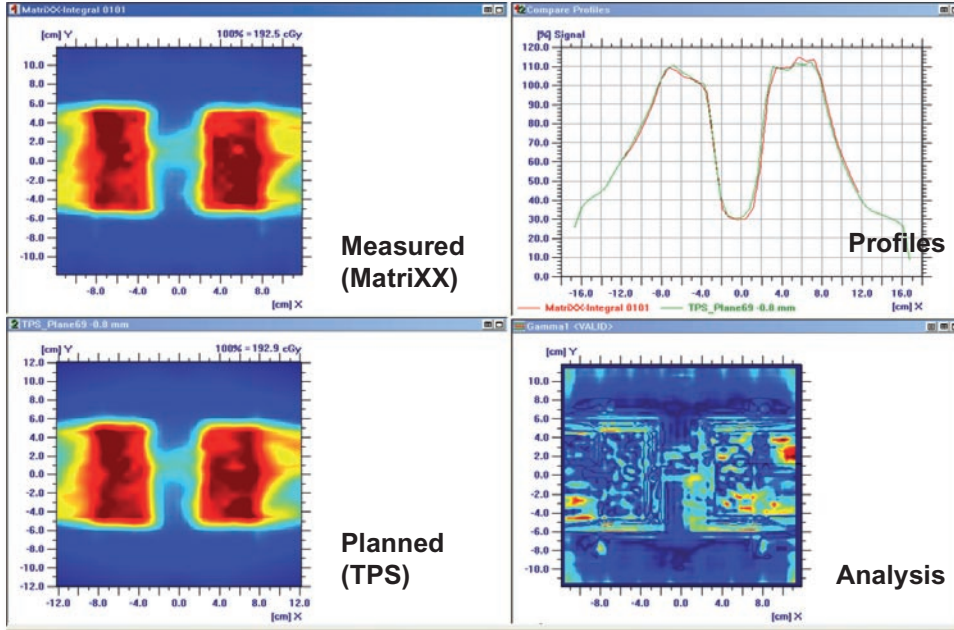
- ▶ Display of each frame as a function of the gantry angle
- ▶ Composite dose distribution measurement. Total delivery time 76 sec

Accuracy

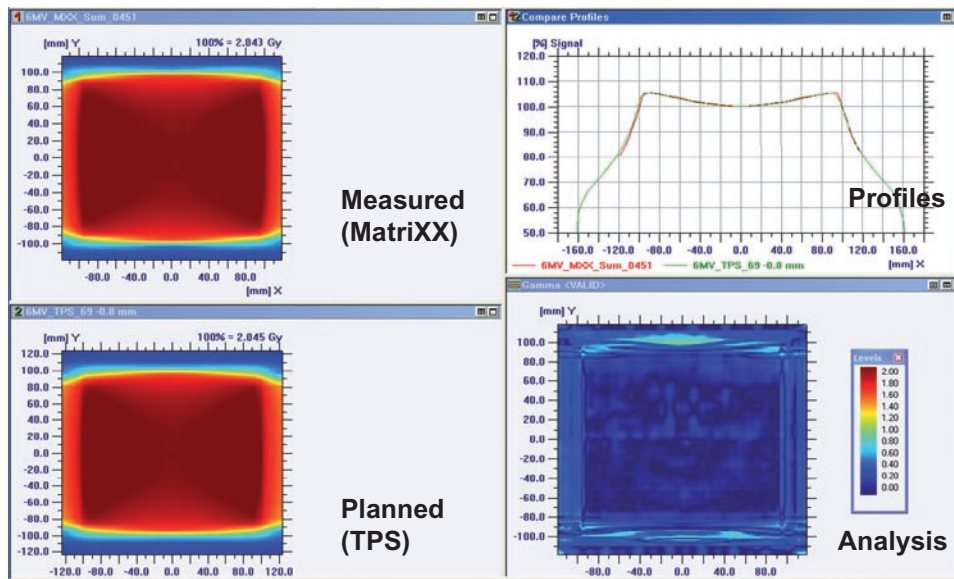


- ▶ MatriXX^{Evolution}, highest reproducibility and accuracy of measurements
- ▶ Angular dependency optimized by the gantry angle measurement

Versatility: both patient and Linac QA



► Patient QA using MatriXX^{Evolution}

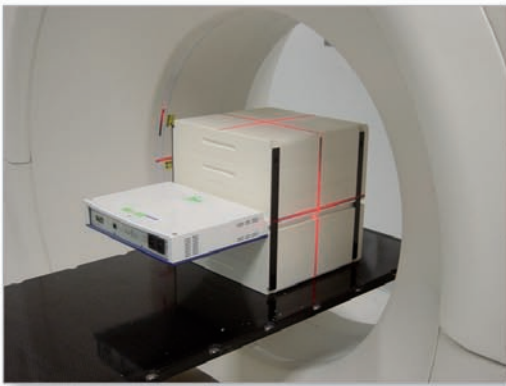


► Linac QA using MatriXX^{Evolution}

The workflow

4 simple steps towards treatment

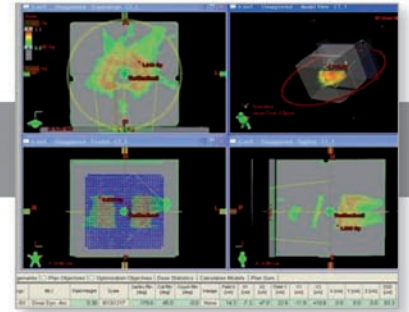
RapidArc™, VMAT



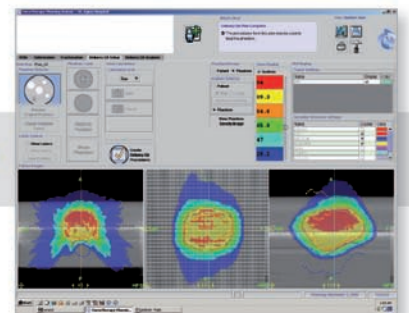
1) CT of MatriXX^{Evolution} with MULTICube and export to TPS

Hi-Art®

PLAN



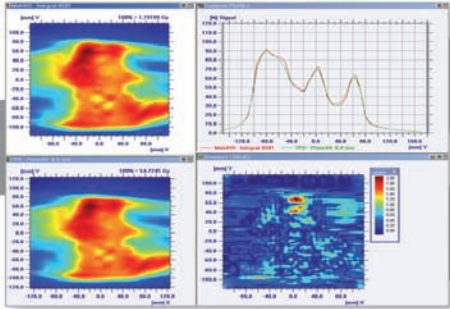
2) Treatment plan is recalculated with chambers at isocenter distance; Dose Maps are calculated and information is exported to OmniPro-I' mRT



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



3) Set-up and deliver plan to MatriXX^{Evolution} and MULTICube



4) MatriXX^{Evolution} data is compared to plan data using the palette of intuitive evaluation tools with OmniPro-I^mRT

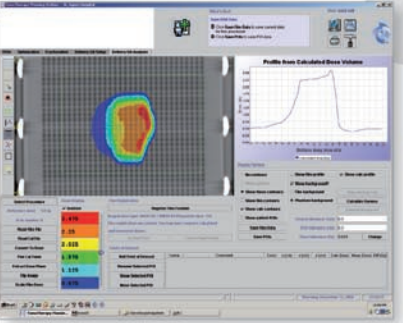
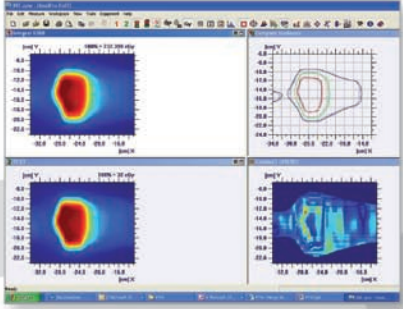


Reject: Further evaluation is needed

4) MatriXX^{Evolution} data is compared to plan data using the palette of intuitive evaluation tools with OmniPro-I^mRT



3) Set-up and deliver plan to MatriXX^{Evolution} and MULTICube



Accept: Patient ready to treat

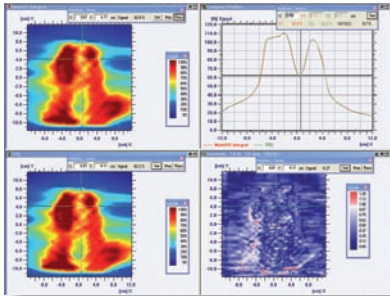


Reject: Further evaluation is needed

Export to DQA for analysis

Clinical proof

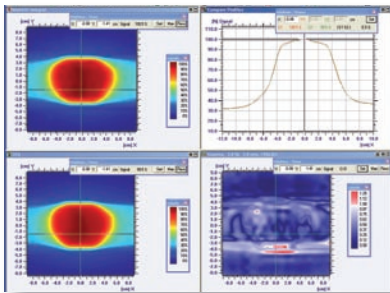
RapidArc™



"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^{Evolution} measurements. In contrast to film measurements, MatriXX^{Evolution} 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^{Evolution} is a suitable detector. We hope that in the future we can fully replace film measurements with MatriXX^{Evolution} dosimetry."

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

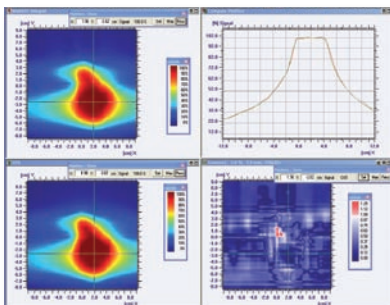
VMAT



"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^{Evolution} 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^{Evolution} 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^{Evolution} 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

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

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

MatriXX^{Evolution}

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

Minimum computer requirements (OmniPro-I'mRT)

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

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 activities in a nutshell

IBA delivers solutions of unprecedented precision in the fields of cancer diagnosis and therapy. The company also offers sterilization and ionization solutions to improve the hygiene and safety of everyday life.

Diagnostics

IBA has unique expertise in the design of cyclotrons and in the production and distribution of radiopharmaceutical tracers which are used every day in hospitals to quickly and accurately detect cancer, neurological and cardiac diseases. IBA also offers dosimetry products used in many hospitals for quality assurance in X-Ray diagnosis and for patient-dose monitoring

Therapy

IBA has developed Radiotherapy solutions and dosimetry equipment to treat cancer with the greatest accuracy. IBA is the undisputed leader in Particle Therapy, acknowledged to be the most precise and effective clinical radiotherapy method in the selective destruction of cancer cells.

Sterilization & Ionization

IBA designs electron accelerators and high power X-Ray solutions used in many industries to sterilize medical devices, to cold pasteurize food products and to improve polymer properties. Over 250 IBA Industrial accelerators are used in the world today, some for more than 40 years.

IBA a Belgian company, is listed on the paneuropean stock exchange EURONEXT and its Annual Reports can be downloaded on the Website: www.iba-group.com.

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