INTEGRATED BEAM SCANNING & ANNUAL QA

myQA® Accept **/ myQA**® SMARTSCAN™

Water Phantoms, Software, Detectors & Accessories

PROTECT +
ENHANCE +
SAVE LIVES

Beam Data Quality ...   ... Fundamental for Patient Safety

1 Highest quality beam scanning results in the perfect beam dataset.

2 Detailed automated check of each scan ensures the perfect beam data set. Only with SMARTSCAN!

3 Correct TPS commissioning - the key for accurate planning and dose calculation.

4 Correct plan delivery and treatment safety. Your peace of mind for all your patients!

High-quality beam data and correct commissioning of your Linac and TPS are the basis for correct RT planning, treatment delivery for patient safety. However, beam commissioning remains a major challenge in most clinics:

Common Pain Points with Beam Commissioning

Your Solution: Efficient and High-Quality Beam Commissioning

AAPM Survey[1]

70%
concerned about quality of beam data

- 70 % of physicists lack full confidence in the quality of their scanned beam data
- Majority reported challenges to commission their Linac with highest quality

25%
spend too much time on commissioning

- 25% of physicists reported excessively long commissioning times for their Linac and annual QA
- Most reported that execution is very inefficient
- Tedious manual operations create potential for human error

Dosimetric Issues in Radiation Therapy

Radiation Therapy Deficiencies Identified During On-Site Dosimetry...
S. Kry et.al.: IJROBP, Vol 99, 5, 2017 P1094-11000

Conclusions: "There is substantial room for improvement of dosimetric issues in RT. Particularly relevant was **suboptimal beam modeling** in the treatment planning system and **a failure to detect these errors** ..."

Click here

Magnitude of error [%]

- ■ Photon small field output factor
- ■ Photon large field output factor

% institutions with errors in output factor
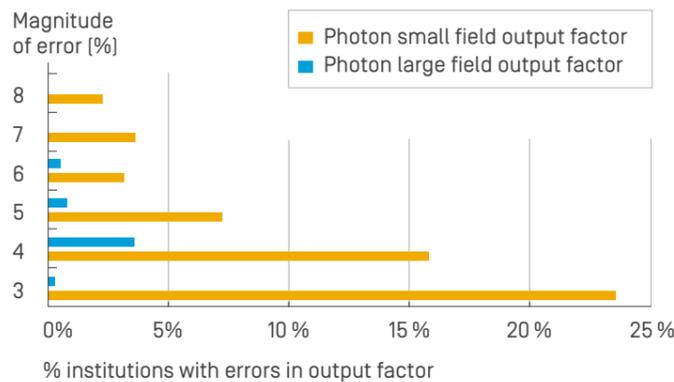
Commissioning **Quality**

Commissioning **Efficiency**

Commissioning **Peace of Mind**

IBA Dosimetry is your most trusted partner for Relative Dosimetry & Beam Commissioning

- ✔ **> 3,400 satisfied customers worldwide trust** IBA Dosimetry integrated beam scanning solutions
- ✔ **> 45 years of experience** in commissioning and annual QA
- ✔ **Leading linac vendors rely on IBA Dosimetry** for their linac production and in their service organizations
- ✔ **1st high-end clinical training center ICC [International Competence Center]**
- ✔ **1973: First computer-controlled water phantom** introduced by Wellhöfer [predecessor of IBA Dosimetry]
- ✔ **2019: SMARTSCAN™** the first automated and guided beam scanning
- ✔ **2020: Monte Carlo Beam Validation Audit Service** for the independent confirmation of your beam data

1) Survey of medical physicists conducted at AAPM 2017 regarding the main pain points with linac beam commissioning

IBA Dosimetry – 45 Years of ...

... Water Phantom Innovations

It all started with the world's 1st computerized water phantom by Manfred Wellhöfer

Introduction of the Blue Phantom family

1st scanning software integrated on a QA platform

1st and only Complete Solution for Automated & Guided Beam Commissioning
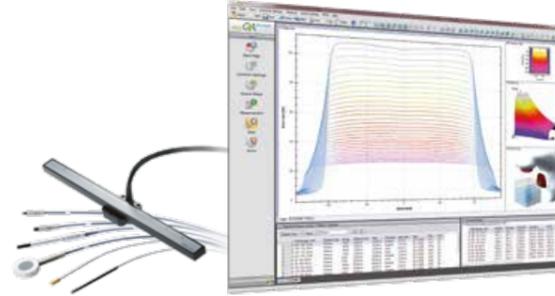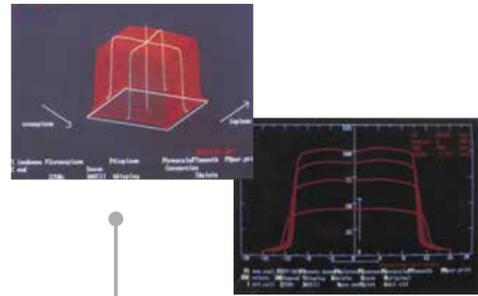
myQA® Accept

GO

SMARTSCAN™
Automated & Guided Beam Commissioning

Wellhöfer WP600

Wellhöfer WP700

Wellhöfer Scanditronix RFA-300

Blue Phantom¹

Blue Phantom²

Blue Phantom Compact

Blue Phantom Helix
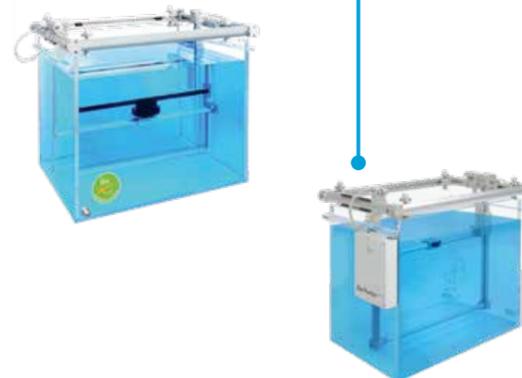
myQA HALO for Varian Halcyon™ / Ethos™ #

> I am truly excited by these impressive water phantom innovations that materialized since Wellhöfer Dosimetry started designing and producing water phantoms 45 years ago. Today, SMARTSCAN represents the forefront of this evolution and, by automating the workflows, marks a new generation in beam commissioning efficiency and accuracy. Take advantage of IBA Dosimetry's deep dosimetry competence and consistent innovation, and automate your linac commissioning with SMARTSCAN.

Manfred Wellhöfer
Water Phantom Pioneer and Predecessor of IBA Dosimetry

For over 45 years, IBA Dosimetry has been providing the highest quality dosimetry equipment to more than 10,000 satisfied customers in over 3,400 RT centers worldwide. The new SMARTSCAN system embodies decades of expertise, research and experience in the development of water phantom systems.

SMARTSCAN™

SMARTSCAN™ transforms commissioning into a highly efficient, trouble-free user experience.

Automated and Guided Beam Commissioning & Annual QA

SMARTSCAN™ is the most precise and efficient solution to run your beam commissioning. SMARTSCAN™ is designed to give you the best possible beam data each time!

Quality. Automated.

- **100% Beam Data Quality**
- SMARTSCAN is designed to deliver optimal beam data quality
- Every single scan is instantly checked to detect human errors
- Suspicious measurements are flagged immediately

Efficiency. Automated.

- **75% Less Commissioning Effort**
- Skip 98% of manual operations through SMARTSCAN automation
- SMARTSCAN guides you safely through the entire commissioning
- Enables faster clinical implementation of Linacs and TPS

Peace of Mind. Automated.

- **100% Confidence in Your Commissioning**
- SMARTSCAN commissioning gives you the certainty that your TPS and Linac operate on a reliable database
- Your foundation for the safe and accurate treatment of your patients

myQA® SMARTSCAN™ Software

Optimized workflow efficiency through smart grouping of scans and Linac settings.

Automatic scanning with instant check of each scan for flatness, beam symmetry, leakage and signal noise. Immediate warnings in case of suspicious scans.

Guided Beam Scanning

- Avoid errors with screen-by-screen guidance throughout the scanning workflow, from preparation to execution
- Minimized user interaction through grouped tasks and optimization of the Linac settings
- Software prompts during the workflow whenever a detector change or other setup tasks are required

Automated Beam Scanning

- Beam triggered automated scanning of the beam queues
- Instant automatic check of every measured scan. Immediate user alert in case of three consecutive poor scans
- Eliminates poor or wasted scans in your beam data
- Repeated automatic checks of background noise
- Automatic electrometer normalizations for every field

New myQA SMARTSCAN™ release 2020 now supports

- FFF beams in baseline measurements
- Electrons
- Varian# Halcyon™ / Ethos™ incl. templates and queues
- CAX FFF for BluePhantom^COMPACT and for myQA HALO

The SMARTSCAN™ Package

SMARTSCAN integrates advanced dosimetry hardware with a completely new software approach:

- ✓ myQA SMARTSCAN software enabling automation and user guidance.
- ✓ Stealth Chamber "beam invisible" reference signal chamber and high-performance ionization detectors.
- ✓ New high-performance Water Phantom for sub-millimeter precision 3D scanning. Includes Lift Table with extendable legs.
- ✓ Water Reservoir with high-speed pump and accessory storage.

Typical Commissioning Time of a Linac*

Save time with SMARTSCAN™ Automation and Guidance

- Eliminate bad scans and need for re-scanning
- Optimize scanning workflow

	0	50	100%
Conventional Manual Commissioning	Scanning	Analysis	Re-scan
SMARTSCAN™ Automated Commissioning	GO		Significantly Shorter Commissioning Times

* Linac with 2 photons.
Times can vary depending on many factors.

See how SMARTSCAN™ can shorten your Radiation Therapy Linac and TPS Commissioning and Annual QA time and effort by 75%, and how SMARTSCAN ensures 100% quality beam data.

James P Nunn, MS, CHP, DABR
Senior Medical Physicist.
LewisGale Hospital Pulaski, VA, USA

❝ *SMARTSCAN has the ability to dramatically speed up the commissioning process. This is achieved through workflow guidance and automation of repetitive tasks that have to be done manually with conventional tanks.* ❞

myQA® Global QA Platform
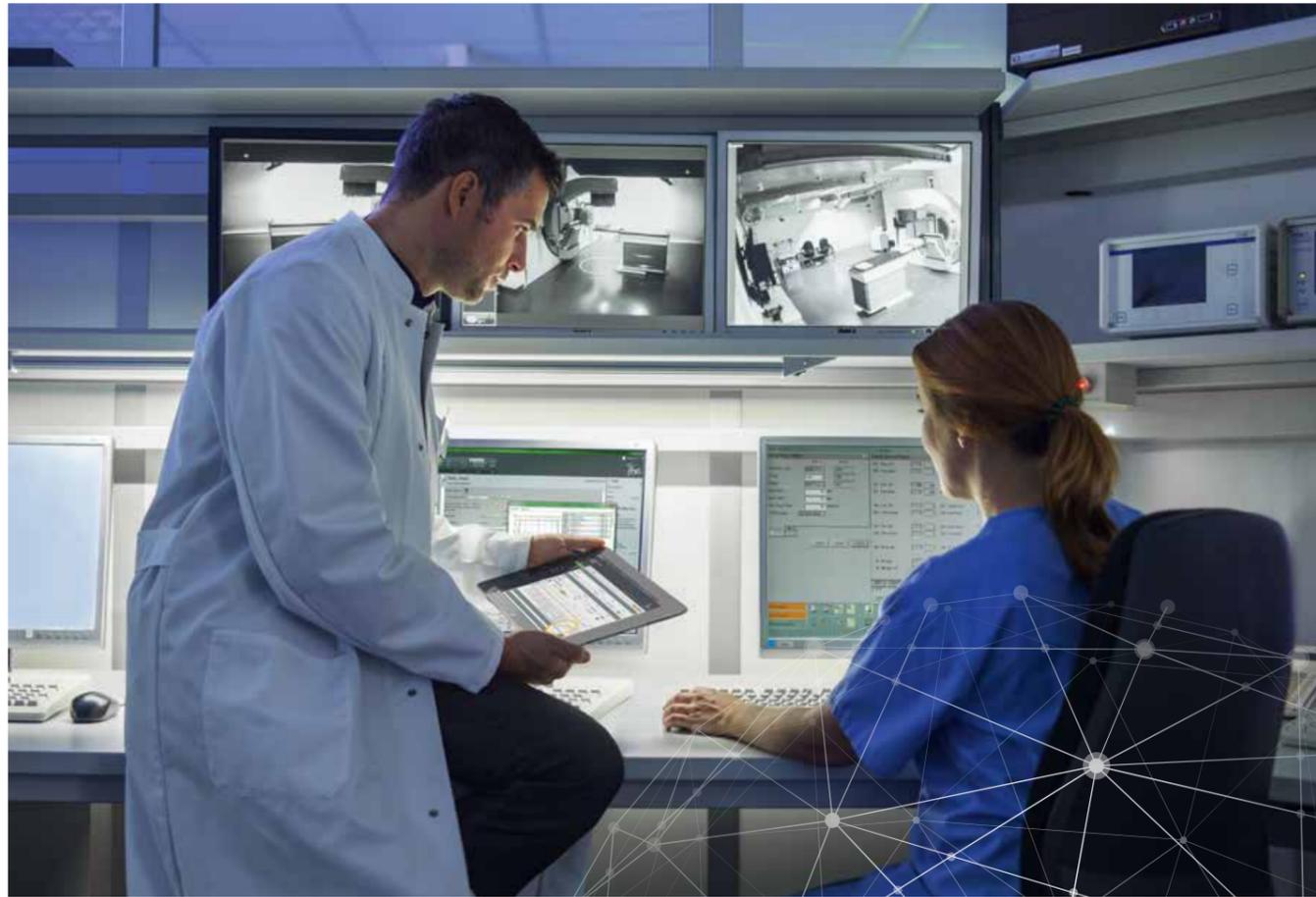
myQA Accept, the leading commissioning and beam scanning software, integrated in the myQA Platform

- Integrate your myQA Accept beam scanning and commissioning data to the myQA ecosystem
- Access your commissioning data anytime from the myQA central database
- Data safety through consistent and secure storage and retrieval of all your QA data
- Use your scan data in myQA Machines as reference for Machine QA

❝ IBA has mastered dosimetry software for commissioning and annual QA with myQA Accept. One of the easiest to use and most intuitive scanning and data analysis solutions out there. ❞

Robert Krauss, Medical Physicist
St. Francis Hospital, Memphis TN, USA

Integrated Software
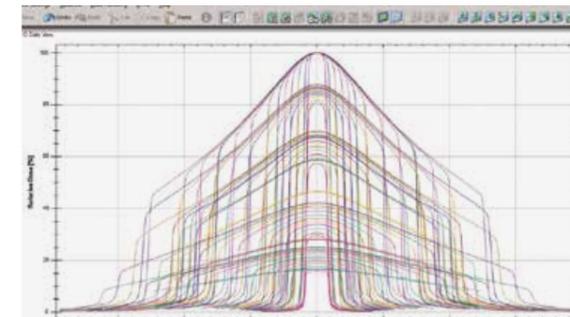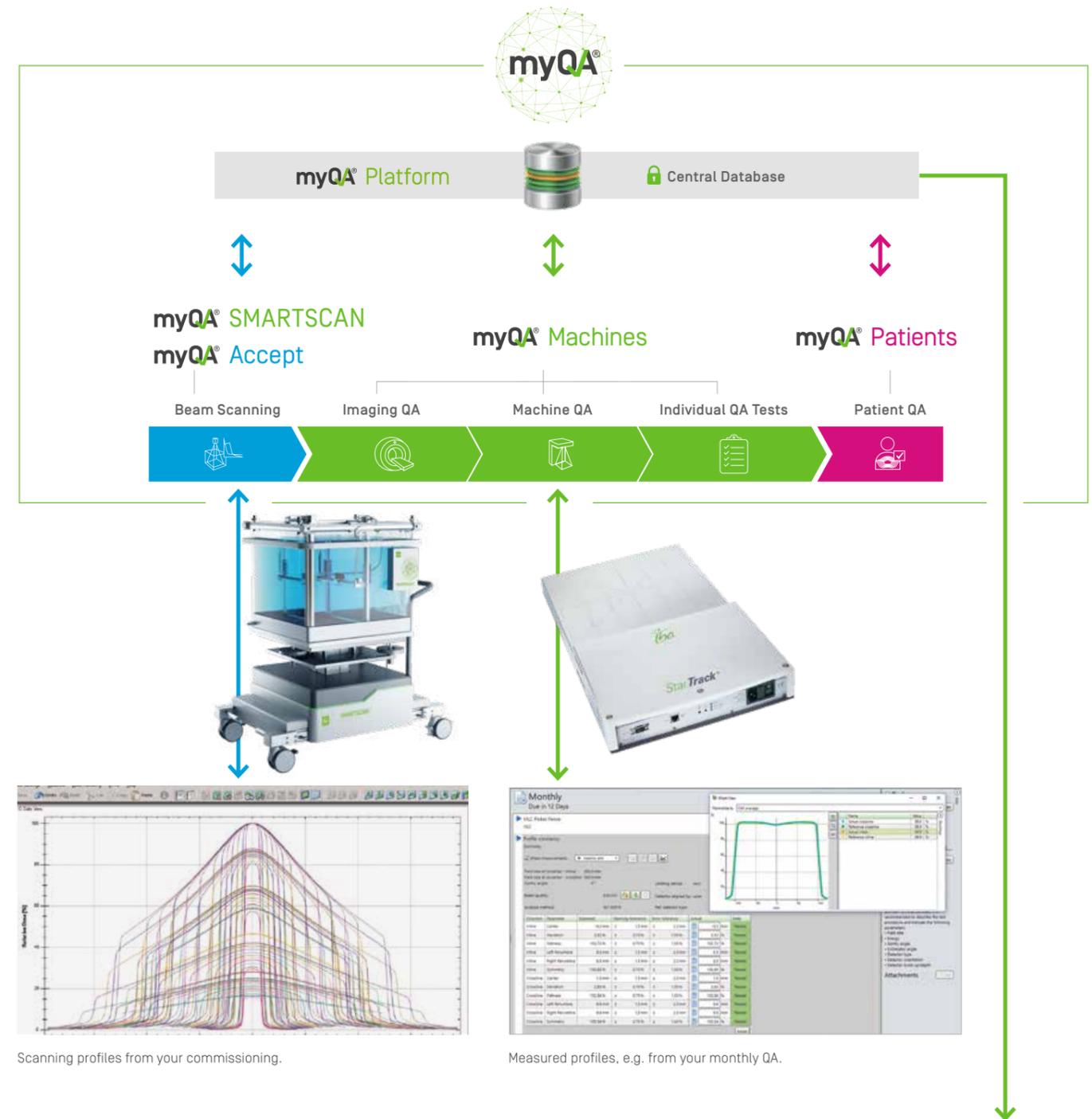
Scanning profiles from your commissioning.
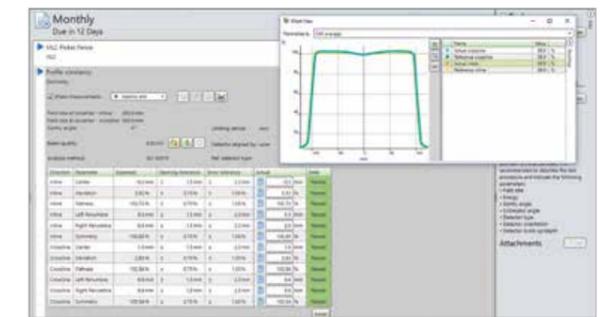
Measured profiles, e.g. from your monthly QA.

Beam Scanning and Machine QA integrated on myQA

- Your commissioning data and machine QA data are both in the central myQA database
- Accessible throughout the hospital network

**Your Integrated Quality Assurance benefit**

- Data analysis, comparison, and reporting all on the myQA platform
- Example: Easily verify the difference of a Machine QA measurement (Star Track) vs. your reference beam profile from your commissioning

Comparison of your monthly QA profiles with your commissioning profiles in myQA.

myQA® Accept | Integrated Beam Scanning
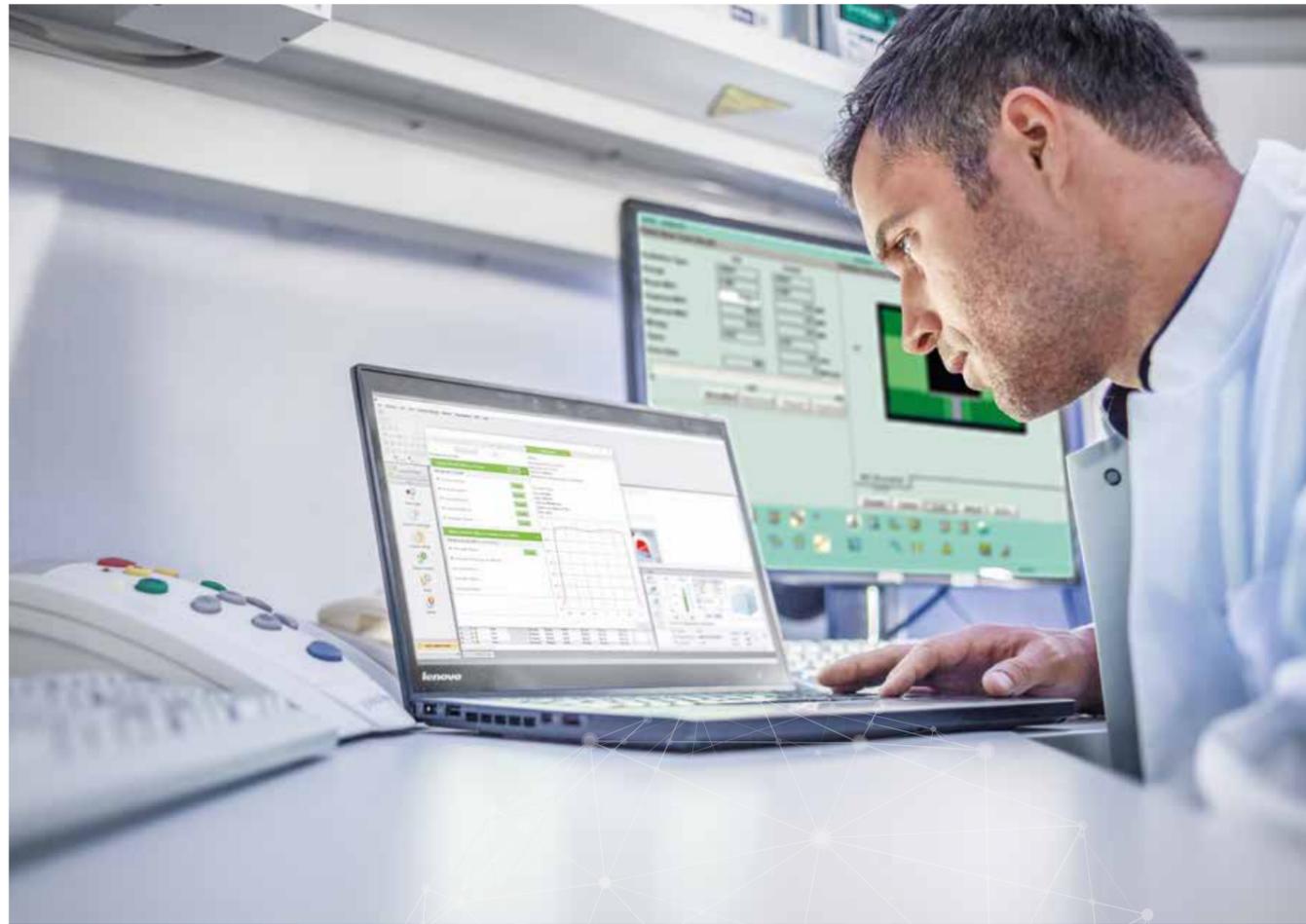
Integrated software for your comprehensive and efficient beam scanning, commissioning and annual QA.

myQA Accept is the most trusted scanning and beam data analysis software for the commissioning of your TPS and Linac, as well as for annual QA.

- Easy workflow interface for all IBA Dosimetry water phantoms
- Comprehensive scanning and commissioning software
- Beam Scanning automation with myQA SMARTSCAN™
- Build your commissioning reference database to compare with new installations and to pair Linacs

① Automated Queue Generation

- Fast & automatic data acquisition with predefined queues for all major TPS vendors
- Save time with smart sorting algorithm for optimized scan sequences
- Maximize scanning efficiency with advanced queue sorting, prioritizing and multiple queue editing
- Intuitive setup of user-specific queues
- Automated data export for TPS beam modeling

② Data Acquisition

- Adjustable scanning parameters for optimized measurements
- 1D, 2D and 3D graphical and geometrical visualization of detector position during scanning
- Automatic scanning speed adaptation: Fastest scanning with optimal resolution through scanning speed adaptation

Adaptive Scan Optimization [ASO]
- Adapted scanning speed for the different profile segments
- Optimized for accuracy in the penumbra area
- Fast continuous scanning where fewer data points are sufficient
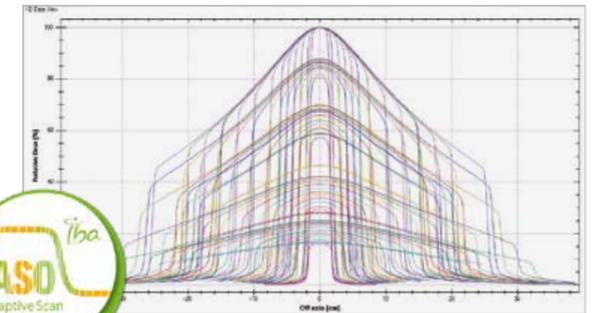
③ Data Analysis

- Accurate data analysis via standard and customizable protocols
- 1D gamma analysis tolerances
- Overlaying profiles for quantitative comparison
- Library of mathematical smoothing and interpolation functions
- Fast creation and export of data tables (PDD, TMR, OAR, etc.)
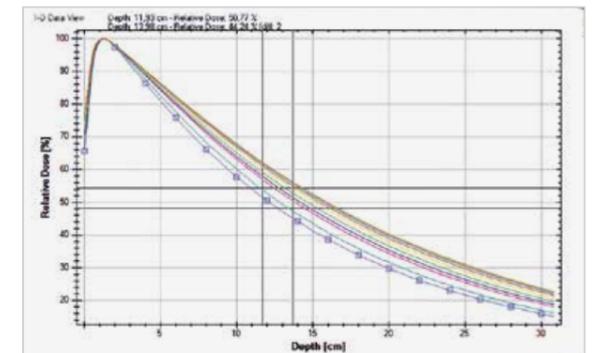
④ Data Handling

- Easy data handling with advanced filtering and sorting
- Fast creation and data export to all major TPS
- Copy & paste to other applications, e.g. MS Excel
- Exchange data with other IBA Dosimetry applications
- Convenient reporting

#1
Beam Scanning Solution Worldwide

>3,400
RT Centers trust IBA Dosimetry for their Commissioning

>15,000
Linacs commissioned with IBA Dosimetry solutions

The Blue Phantom Family

Stealth Reference Chamber

Blue Phantom² filled with AquaBlue, a special water treatment for protecting mechanical parts and protecting water from decay.

Highest Quality Water Phantoms

IBA Dosimetry Water Phantoms embody decades of expertise, research and experience in the development and clinical use of water phantom systems. This experience results in water phantom innovations for the most efficient, most accurate and most reliable scanning:

- 0.1mm certified accuracy, enabling small field dosimetry
- 1-minute user validated precision leveling to easily compensate for couch sag
- "Beam invisible" patented Stealth™ reference chamber

> " *The Blue Phantom² scanning system with myQA Accept and Stealth Chamber™ is the perfect combination for fast data collection. I was pleased how easy it was to set up the water phantom and to attach the Stealth Chamber to the Linac with no need to change or reposition the chamber during the whole commissioning process. This saved us a lot of time. The scan results and the excellent reproducible reference signal quality absolutely satisfied all my needs!* "

Dipl. Phys. Univ. Mathias Dierl
Head of Medical Physics, Radiation Therapy,
Medical Center Bayreuth, Germany

CCU: Common Control Unit for all your IBA Water Phantoms

- The compact design of the CCU integrates a controller and two independent electrometers
- Simultaneous support of diodes and ionization chambers

Connects all your IBA water phantoms

CCU
Common Control Unit

myQA® Accept
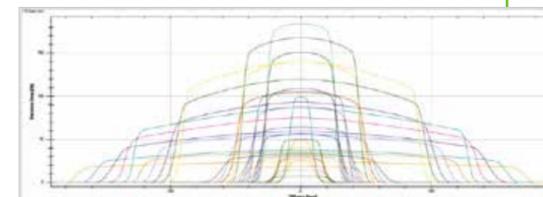
myQA® SMARTSCAN™ **GO**
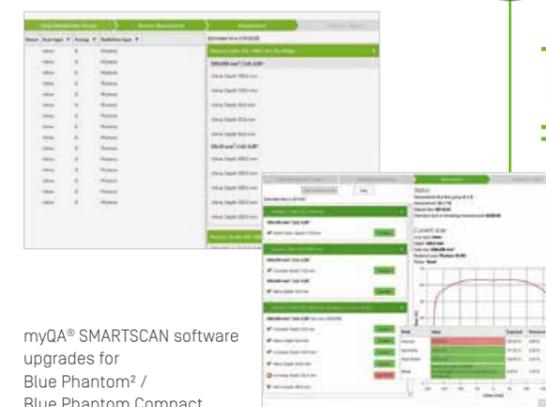
Upgrade

myQA® SMARTSCAN software upgrades for Blue Phantom² / Blue Phantom Compact

The Blue Phantom Family Designed for Accuracy & Efficiency

Blue Phantom² – The 3D Water Phantom

- The most trusted 3D water phantom solution for comprehensive beam scanning and RTPS/Linac commissioning and annual QA
- The high-end water phantom has a modular design and can be configured and upgraded to fit any need and budget
- Upgradable with SMARTSCAN™ software for scanning automation and guidance
- Compatible with all standard Linacs, Halcyon™, and CyberKnife® #

Blue Phantom COMPACT – The 2D Water Phantom

- 2D high-end water phantom, half the size of Blue Phantom² and minimized weight
- Promotes easy transportation with more efficient use, e. g. for annual checks
- Ideal for satellite hospitals and commissioning service providers
- Optimized for Varian® Halcyon™ / Ethos™ commissioning validation and annual QA (details next page) #

Blue Phantom Helix – For TomoTherapy®

- 3D scanning solution for the TomoTherapy® / Radixact® System #
- Find more information on next page

Dedicated Beam Scanning Solutions

GO
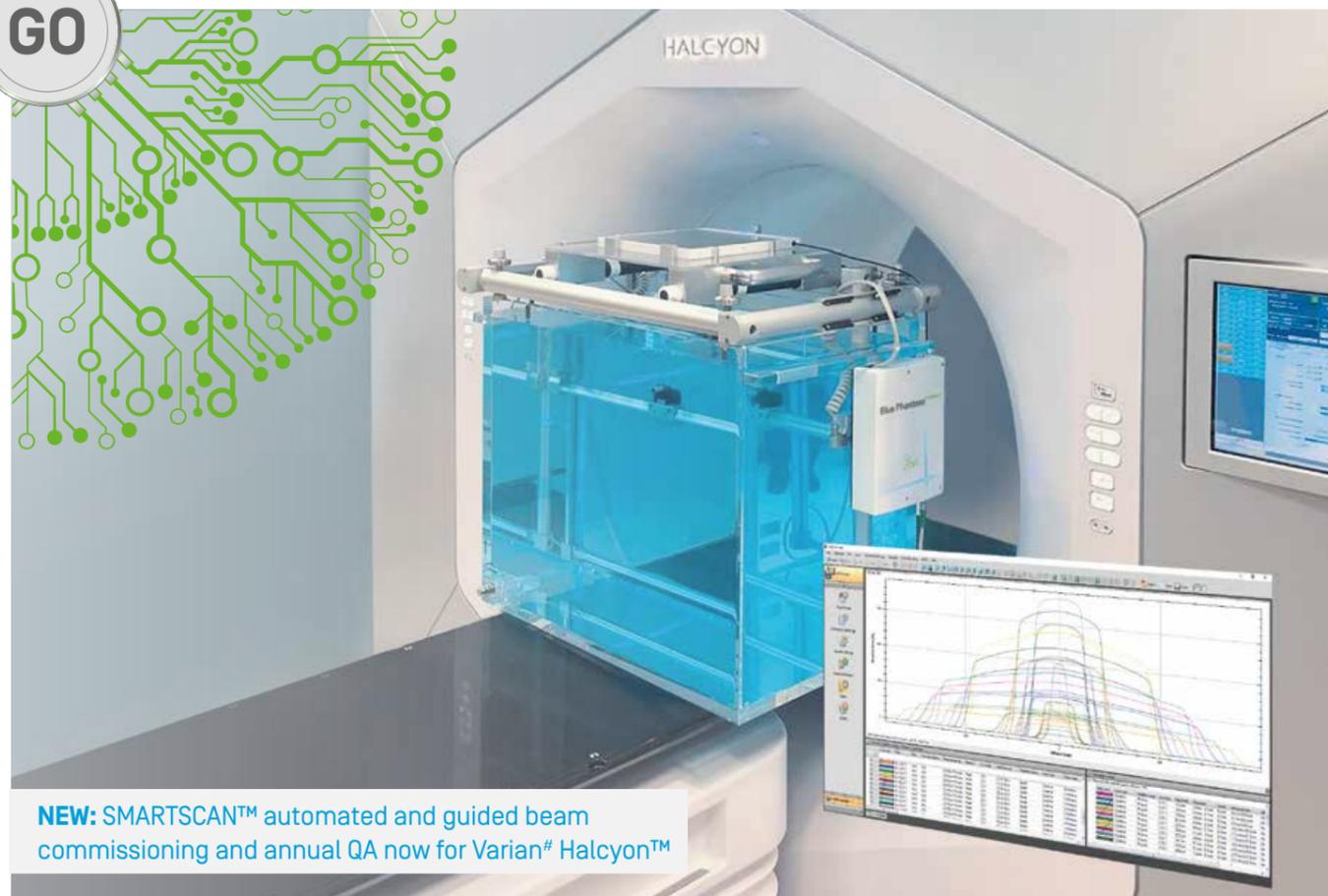
NEW: SMARTSCAN™ automated and guided beam commissioning and annual QA now for Varian# Halcyon™

myQA HALO™ for Varian# Halcyon™ / Ethos™

myQA HALO™ is the dedicated, proven package solution for independent commissioning & validation and beam data collection of the Varian Halcyon™ as well as for monthly and annual scans. The package consists of cutting-edge beam scanning components that are released, clinically implemented, and trusted by over 4,000 satisfied users worldwide!

INDEPENDENT VALIDATION

- Integrated Quality Assurance for your Halcyon™ with the #1 Beam Scanning software: **myQA Accept**
- **myQA SMARTSCAN** now supports automated and guided beam validation for Varian# Halcyon™ / Ethos™. Faster workflow through templates and optimized queues.

- **Blue Phantom Compact** tank designed for fast collection of all needed scans, low weight for minimal Halcyon™ couch sag
- Unique **Stealth** reference chamber including special holder compensates for the absence of light field
- 1-minute validated leveling solution

Blue Phantom Helix for TomoTherapy® / Radixact®#

Blue Phantom Helix is dedicated for full 3D scanning of the TomoTherapy/Radixact System. Based on the proven Blue Phantom², this water phantom enables fast and accurate commissioning and QA work optimized for TomoTherapy.

- Optimized 3D water phantom for faster scanning
- Efficient measurements & analysis with myQA Accept
- Certified 0.1mm high positioning accuracy and outstanding reliability
- Long-term mechanical stability

IBA Dosimetry QA solutions were used by the University of Pennsylvania medical physics team to validate the new Halcyon™ linear accelerator for release and clinical use:

We had a very good experience using our Blue Phantom solution to validate our Halcyon™ Linac. The setup was very straightforward, and the flexibility of the myQA Accept software was essential … The bulk of our validation work was done in 3 days.

Chris Kennedy PhD, DABR
Medical Physicist, University of Pennsylvania, USA

IBA Dosimetry Water Phantom Innovations

Designed by experts for high-performance and long-lasting beam scanning reliability and accuracy.

1-Minute Leveling, Visually Verified.

Intuitive and precise 4-point interactive micro leveling.

- Faster and more accurate than automated setup
- Visual check provides confidence in setup accuracy
- Avoids time needed for redundancy checks required by automated setup procedures
- Enables permanent visual check of the leveling and water surface level to detect water evaporation during longer commissioning times
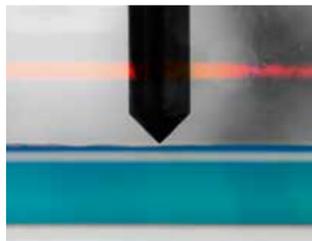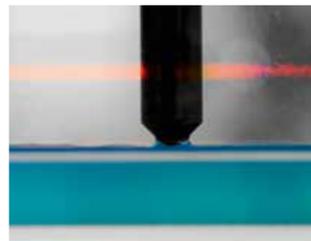
For leveling, simply adjust the four alignment pins towards the water surface ❶ until the water surface adhesion touches the tips ❷.

Certified 0.1 mm Accuracy

- Uncompromised accuracy for your RTPS and Linac commissioning
- Only IBA Dosimetry water phantoms are calibrated and certified to guarantee the highest accuracy and reproducibility of ± 0.1 mm
- Have full confidence in your beam data
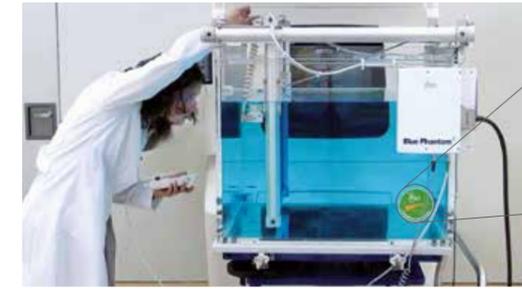
Continuous, Long-Lasting Accuracy

- The unique magnetostrictive sensor technology provides continuous readouts of the water phantom's absolute position in all three axes (even when not moving)
- Certified detector repositioning accuracy of ± 0.1 mm
- The contactless sensor technology minimizes mechanical wear and ensures long-lasting accuracy
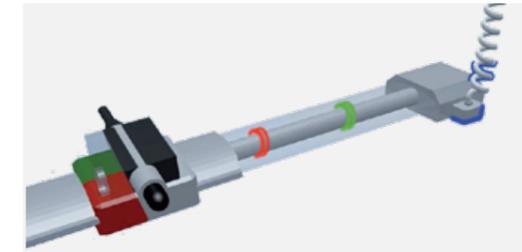
Unique sensor technology for certified accuracy

Consistent Accuracy in X and Y Axes

- Small ionization chambers like the IBA Dosimetry CC-04 ensure scanning accuracy independent of the scanning direction, regardless of detector movement and orientation (according to TG-106 report)
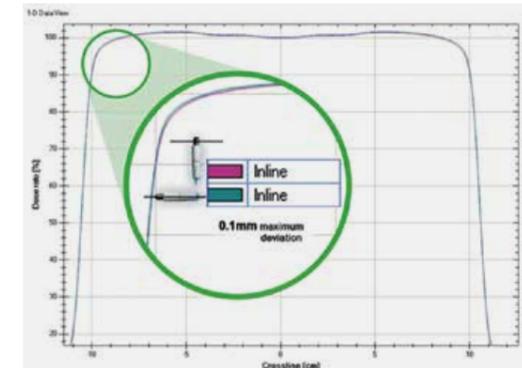

## High-End Clinical Training Courses at IBA Dosimetry

Become an expert in commissioning and beam scanning and learn how to commission with the highest efficiency and data quality!

- Best-practice courses conducted by real dosimetry experts
- Clinical hands-on with SMARTSCAN, myQA Accept and Blue Phantom²
- Special trainings for small fields, FFF, transmission reference chamber, data processing and more

Find full information at icc-ibadosimetry.com

Check out our free E-Training Videos

Accessories for Blue Phantoms

Lift Table – Compact Design

- Lift Table with extended legs can be set up without putting weight on the Linac couch ring
- Water Phantom carriage with manual or electric (telescopic) lifting
- Convenient and fast positioning of the water phantom
- Includes leveling frame for vertical and horizontal micro adjustment (electrical version)

Clears linac turntable

Water Reservoir

- Separate tank trolley on wheels with a polyethylene water reservoir
- Small footprint allows convenient storage and easy maneuvering in narrow mazes
- High performance pump for uni-directional or bi-directional water transport to and from the water phantom
- Electronic pump control for TMR/TPR measurement (option)

TMR Set

- For continuous TMR depth dose curve measurement with real-time display of dose vs. water level
- Online measurement of tissue maximum ratio (TMR) with fixed source detector distance
- High-accuracy contactless sensor technology to accurately measure changing water level

Temperature Sensor

- Water temperature measurement in combination with pressure measurement (built-in the CCU)
- ± 0.3 °C measurement accuracy

Detectors

High-Quality Ionization Chambers and Diode Detectors

- Full range of ionization chambers and diode pSi semiconductor detectors optimized for water phantoms and solid phantoms
- Ion Chambers from IBA Dosimetry in-house production
- Extensively tested to meet highest RT dosimetry standards
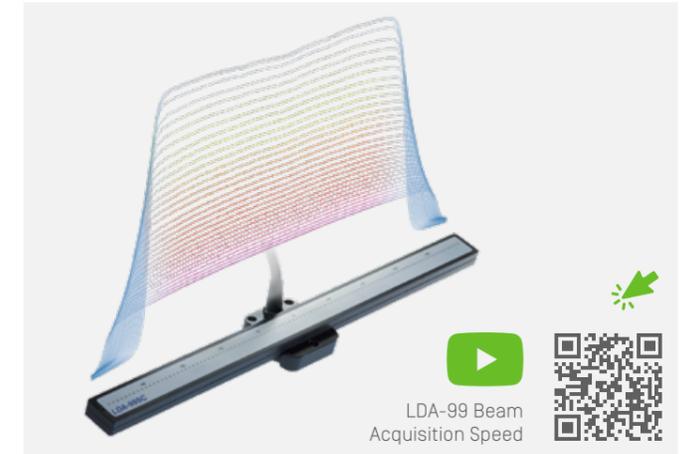
Linear Diode Array LDA-99

- 5 times faster beam scanning, dramatically shorter commissioning times
- Scans the complete profile at once
- High resolution measurements down to 0.5 mm

LDA-99 Beam Acquisition Speed

Small Field Dosimetry Detectors

The ideal solution for superior SRS and SBRT beam commissioning

### Stealth Chamber – Unique Reference Chamber

- Patented "perturbation-free" design attached to the gantry for excellent reference signal quality
- Eliminates frequent reference chamber repositioning and therefore dramatically reduces the need to enter the Linac room

RAZOR – Ion Chamber and Diode Detectors

- Beam data accuracy for extremely small SRS/SBRT field scanning
- RAZOR NanoChamber: World's smallest ionization chamber with active cavity of 0.003 ccm
- RAZOR Chamber: Compact air ionization chamber. Cavity volume 0.01 ccm
- RAZOR Detector: High-performance diode detector

❝ *The IBA Stealth reference chamber is saving us enormous amounts of time. The scans we performed with the Stealth Chamber were outstanding. It was very obvious that the scans were much smoother with less disturbance, allowing us to speed up scanning motion. Also, due to the hidden chamber we don't have to go back into the vault to reposition, which saves us additional time.* ❞

Luis Alberto Vazquez Quino, PhD, and Mark Deweese, MS
Medical Physicists at Mid-South Radiation Physics, Inc., USA

Stealth Publication:
Epstein et.al: **Evaluation of a novel Transmission Detector as a Reference Chamber for Use in Beam Measurements.** Medical physics (2015) 42. 3420.

Beam Data Verification Audit Service with Monte Carlo


Is your beam data correct?
FIND OUT!
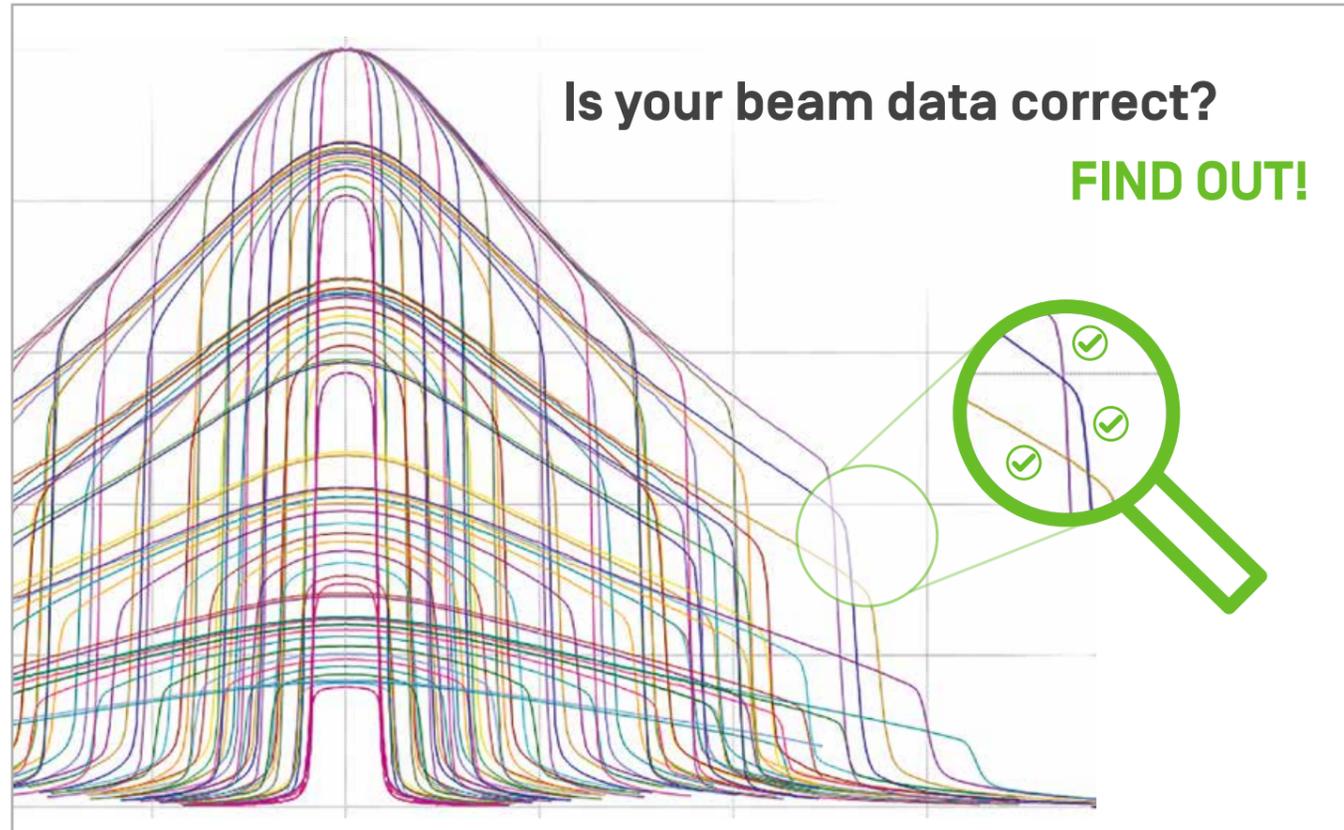
The Solution:
Beam Data Verification Audit

To verify the quality and the accuracy of you commissioning beam data you can now benefit from a new and unique audit service based on highly accurate Monte Carlo simulation and analysis.

This service provides a trustful audit result that is independent, high quality and reliable.

The result:
You gain clarity and the peace of mind that the quality of your new or existing beam data is accurate, or know how to improve your data and scans if needed.

- Simply submit your commissioning data for the audit and gain full insight into the quality of your dataset.
- The report includes comprehensive details of the sources of inconsistencies or errors and provides guidance on how to resolve them.
- The audit is available for beam data of any water phantom and for all standard C-Arm Linacs, Halcyon™, Ethos™, CyberKnife®, TomoTherapy®/ Radixact®.#

Typical beam data errors detected with Monte Carlo

Wrong Voltage

Penumbra Discrepancy

> I have validated our beam commissioning data using the Monte Carlo modeling within SciMoCa. The comprehensive validation report provided guidance to improve the PDD and MLC leaf calibrations in the TPS. We now have the confidence that our beam data is correct and that our treatment plan calculations are of high quality.

M. Kowatsch, Senior Medical Physicist, LKH Feldkirch, Austria

Watch Webinar

> The quality of our measured beam data is critical to ensure accurate treatment planning and delivery, especially for stereotactic and other precision therapies. Medical physicists are challenged by varying responses from diodes and ion chambers because of the inherent differences between the different detectors. For the absolute confirmation of accuracy of beam data, I believe that Monte Carlo validation is the path forward for verifying small field beam data and has broader implications for verification of data for larger field sizes as well.

Raj K. Mitra, PhD, DABR.
Ochsner Health System – New Orleans, LA, USA

The Challenge:
Errors based on poor commissioning data

Errors in beam data collection are reported to frequently lead to flawed TPS beam models and thus to systematic dose computation errors. These systematic beam data errors are difficult to spot and to eliminate1).

- Commissioning is a challenging process requiring in-depth experience, especially for small field dosimetry.
- Commissioning is usually done under time pressure, and the job is repetitive and error-prone.
- International recommendations for independent audit of the data by a qualified medical physicist (e.g. AAPM TG-106, AAPM TG-53, ESTRO Booklet 10...).

Dosimetric Issues
in Radiation Therapy

Magnitude of error [%]

- Photon small field output factor
- Photon large field output factor

% of institutions with errors in output factor

RT Deficiencies Identified During On-Site Dosimetry...
S. Kry et.al.: IJROBP, Vol 99, 5, 2017 P1094-1100

Integrated Beam Scanning & Annual QA

Technical Specifications

SMARTSCAN™	
SMARTSCAN™ For specifications please refer to the SMARTSCAN™ brochure.	

Blue Phantom²	
Scanning volume [X/Y/Z]	480 × 480 × 410 mm
Position accuracy	± 0.1 mm
Position reproducibility	± 0.1 mm on 3 axes, calibrated and certified
Dimensions [L × W × H]	675 × 645 × 560 mm
Weight [empty]	45 kg
Wall thickness/material	15 mm/acrylic
Approximate volume	200 l

Blue Phantom Compact / myQA HALO Phantom	
Scanning volume [X/Z]	478 × 410 mm
Position accuracy	± 0.1 mm
Position reproducibility	± 0.1 mm on 2 axes, calibrated and certified
Dimensions [L × W × H]	645 × 407 × 550 mm
Weight [empty]	36 kg
Wall thickness/material	15 mm/acrylic
Approximate volume:	116 l

Blue Phantom Helix	
Scanning volume [X/Y/Z]	520 × 140 × 200 mm
Position accuracy	± 0.1
Position reproducibility	± 0.1 on 3 axes, calibrated and certified
Dimensions [L × W × H]	680 × 407 × 350 mm
Weight [empty]	27 kg
Wall thickness/material	15 mm/acrylic
Approximate volume	80 l

Common Control Unit [CCU] Electrometer	
Time constant	20 ms
Bios voltage range	± 0 V up to ± 500 V
Full scale range	0.4 nA/40 nA/4 uA
Sensitivity	High: 400 fA – 400 pA / Medium: 250 pA – 40 nA Low: 25 nA – 4 µA
Mains supply	100–240 V AC ± 10 %; 50/60 Hz

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- in LinkedIn | linkedin.com/company/iba-dosimetry-gmbh
- ✖ Twitter | twitter.com/ibadosimetry