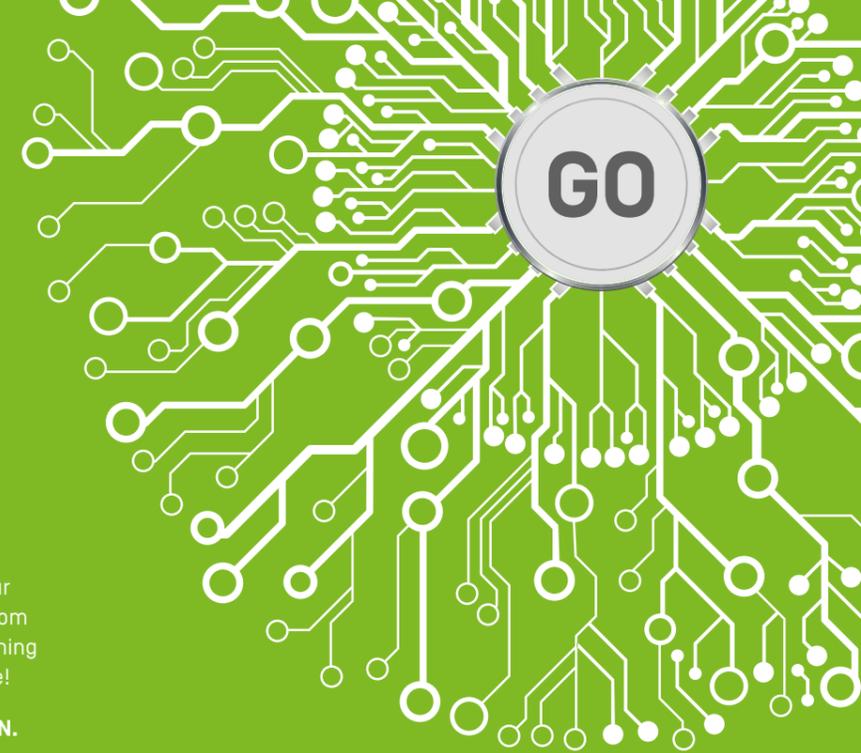


SMARTSCAN™

Peace of Mind. Automated.

Automated and guided beam commissioning

PROTECT +
ENHANCE +
SAVE LIVES



Why SMARTSCAN?

Get thousands of beam scans done effortlessly. Save your valuable time and manual operations at the water phantom and scanning software. Complete your beam commissioning efficiently, conveniently, and accurately like never before!

Touch the GO button to launch the world of SMARTSCAN.

A crucial duty requires

Beam data quality drives patient safety!

Commissioning a linear accelerator or a new RTPS with traditional manual water phantom systems is tedious work. Intensive manual user operation is required to measure and analyze about 1,000 beam scans.

The entire scanning workflow demands continuous user interaction with the software and hardware – which takes days, weeks, and even more weekends and night shifts. The monotonous repetition of similar tasks to take the required measurements is susceptible to human error.

Commissioning is an intensive effort that requires in-depth experience. Faulty measurements need to be repeated. Sometimes the data is interpolated using fewer measurements, or beam profiles are flattened by algorithms.

And you've put an enormous amount of personal effort into not compromising the data quality.

a smart solution: SMARTSCAN

SMARTSCAN drives beam data quality!

SMARTSCAN is the efficient and precise solution to run your beam commissioning. It guides your workflow efficiently and gives you automated control and overview at the same time.

Quality. Automated.

SMARTSCAN is designed to deliver optimal beam data quality. It checks every single scan during the process. Suspicious measurements are flagged immediately. This enables you to reach highest standards in the shortest time – constantly.

Efficiency. Automated.

SMARTSCAN guides you safely through the whole commissioning process and automates repetitive tasks. The process is transformed into a supremely efficient experience for the user. On the other hand, it allows a sooner clinical implementation of LINACs and RTPS.

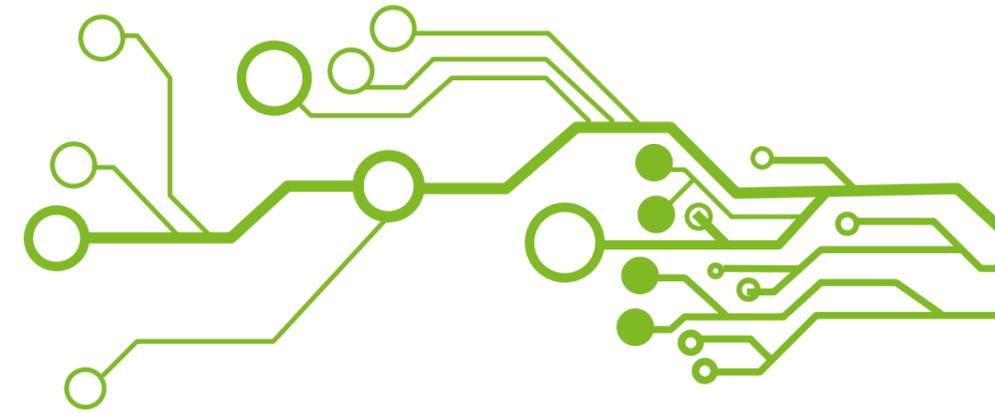
Peace of Mind. Automated.

With SMARTSCAN, you will finally have the certainty that your RTPS and LINAC work on a reliable data base – the foundation for a safe and accurate treatment of your patients.

Automated and guided beam commissioning

SMARTSCAN delivers exceptional data quality in the shortest possible time. How does it do that?

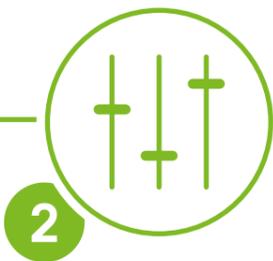
With smart automation and user guidance along the entire workflow, SMARTSCAN plans precisely what needs to be done, optimizes each step of the workflow, automates repetitive tasks, and keeps track of the accuracy of the process.



1

Scanning queue definition.

The user defines the correct scanning queue based on the local LINAC and TPS setup. This is supported by templates specific to the TPS. The queue can be easily adapted. SMARTSCAN gives guidance for correctly chosen equipment and protocols.



2

Measurement parameter optimization. Automated.

For every beam profile and depth dose curve in the queue, SMARTSCAN automatically determines the optimal scan speed and output step-width. It chooses the right sensor and electrometer input sensitivity to measure the signal at the highest precision.



3

Organizing the work. Automated.

Now SMARTSCAN runs a background measurement for every electrometer channel and sensitivity, followed by LINAC dose-rate measurement to determine the characteristics of the LINAC. For all scanning groups in the queue, SMARTSCAN determines the required LINAC Monitor Units. Based on all this information, SMARTSCAN now sorts the work items to reduce the number of required user interactions and the movement path of the sensor to a minimum.



4

Setup alignment check. Automated.

SMARTSCAN performs an automatic LINAC alignment check. This ensures the perfect alignment of the central axes of the beam to the axes of the 3D mechanics, as well as to the water surface. It automatically corrects minor adjustments to the center where necessary and appropriate.



5

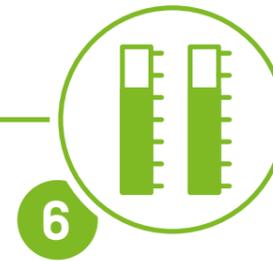
Full system check. Automated.

SMARTSCAN confirms the accuracy of the entire system setup by running a small set of selected key measurements. If the data quality is poor, the physicist can now tune the setup before starting the extensive series of measurements. Key checks include beam symmetry, d_{max} value, signal noise, background noise, and scatter influence.



GO.

SMARTSCAN now executes an extensive and optimized worklist. While performing as many measurements as possible automatically, SMARTSCAN guides the user through all required detector changes and inputs on the LINAC console.



6

Signal input normalization. Automated.

SMARTSCAN automatically performs an electrometer signal normalization at each change of field size, energy or detector.



7

Online QA check. Automated.

SMARTSCAN performs an immediate quality check for each measured profile and informs the user in case of detected deviations. SMARTSCAN automatically checks for the correct field size and signal noise behavior.

Beam commissioning 4.0

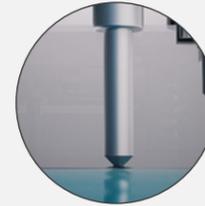
Stealth Chamber

"Beam-invisible" reference signal chamber supports small-field dosimetry in particular. It delivers remarkable efficiency with uncompromising accuracy.



4-point micro-leveling frame

Precise and intuitive 4-point micro-leveling for sub-millimeter alignment without moving the heavy filled water phantom.



Alignment pins

Invented by the ancient Egyptians, a fine tip on the water surface makes the perfect alignment visible. Leveling is accomplished in a few moments.

Contactless sensor positioning technology

The unique magnetostrictive sensor technology provides continuous readouts of the SMARTSCAN's absolute position in all three axes (even when not moving), with a certified detector repositioning accuracy of ± 0.1 mm.

Connector box

Connecting the sensors, electronics, and hand pendant.

Field Detector

Precise measurements require the most stable and reliable detectors. The range of easy-to-use air-vented ionization chambers even handle small volumes, enable fine measurements, and provide a pure, beam energy-independent signal.

RAZOR Nano Chamber

With its 0.003 cm^3 volume, this is the world's smallest commercially available air-vented ionization chamber for dosimetry. It enables scanning with a high resolution of small fields $< 2 \text{ cm} \times 2 \text{ cm}$.



SMARTSCAN Water Phantom

Optimal materials and craftsmanship, perfected by smart details for long-lasting performance.

Integrated handle

with cable protection box.

Slanted bottom

for complete draining of the tank.

Quick coupling

to the SMARTSCAN Water Reservoir that fills or drains the phantom in just six minutes.

SMARTSCAN Lift Table

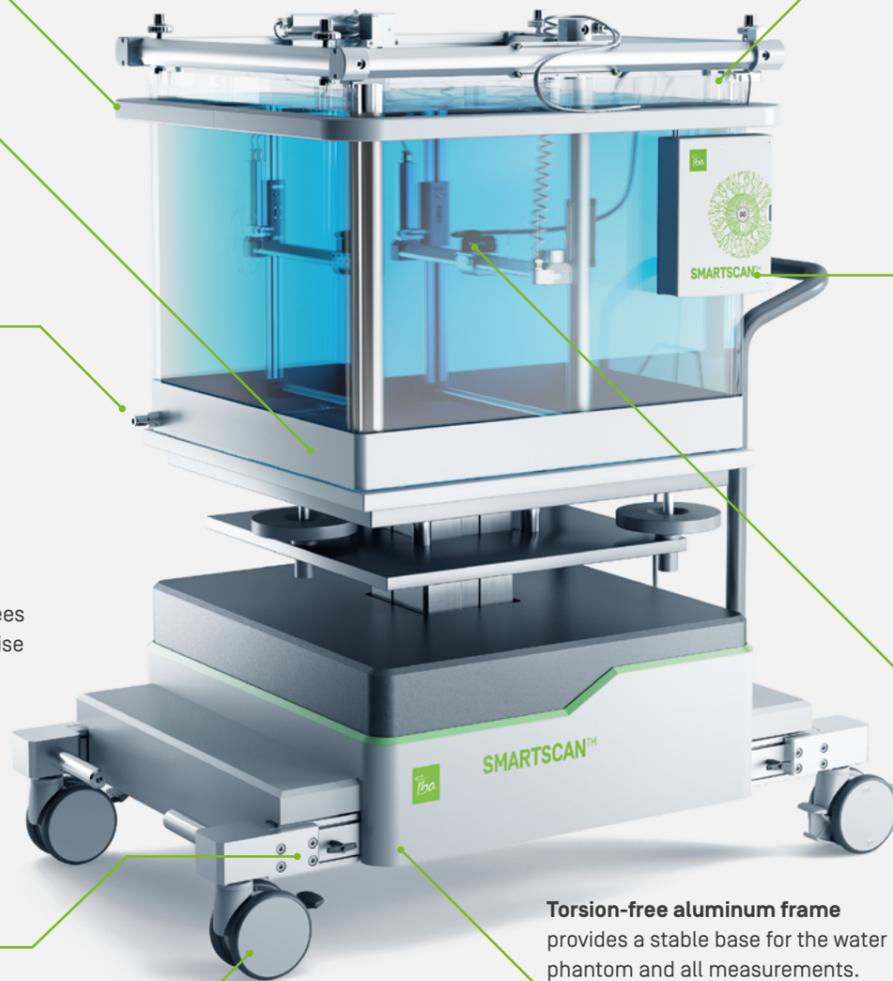
The powerful spindle mechanism guarantees precise lifting while positioning and a precise height during measurement.

Telescopic legs

extend to bridge the LINAC turntable, ensuring a small footprint when transported through narrow mazes and aisles and for storage.

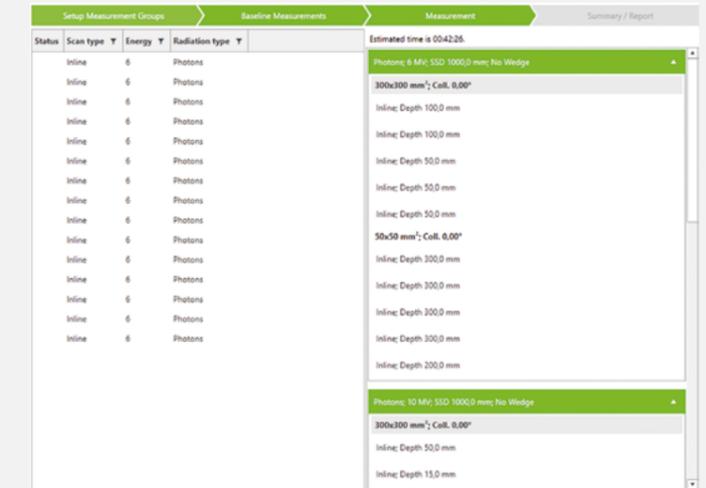
Big wheels

move the valuable equipment easily, even on uneven surfaces. Strong brake that's easy to release.



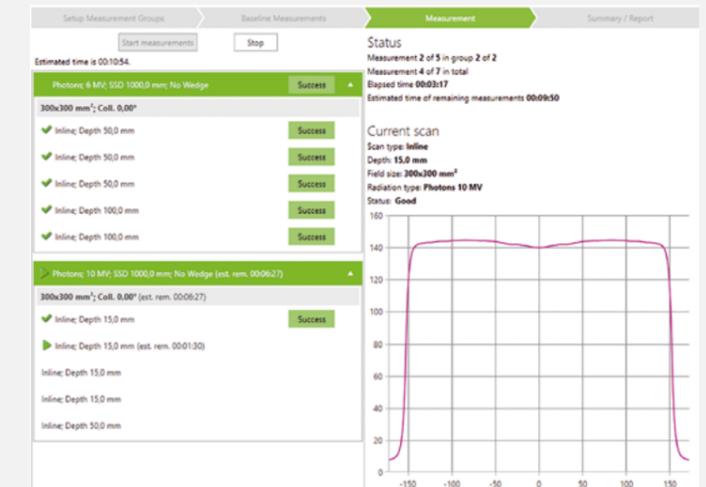
myQA Accept SMARTSCAN

Smart and reliable – SMARTSCAN is seamlessly integrated into the global QA platform



Beam scanning. Guided.

SMARTSCAN guides users screen by screen through the scanning workflow, from preparation to execution. SMARTSCAN groups all tasks to reduce manual changes to a minimum and suggests settings for the LINAC. As soon as the Stealth Chamber detects the beam, SMARTSCAN automatically performs the next group of the measurements. In the same way, the user is guided whenever a change of detector or other setup tasks are required.



Beam scanning. Automated.

SMARTSCAN automates most of the repetitive tasks while executing the beam scan queue. Every beam profile and depth dose curve [FF/FFF] measurement is instantly checked for flatness, beam symmetry, and signal noise. If the set limit values are exceeded, SMARTSCAN informs the user immediately. After three consecutive poor measurements, SMARTSCAN pauses and suggests a setup check; otherwise, further measurements would be wasted. In addition, SMARTSCAN repeatedly checks background noise and performs electrometer normalizations for every field.



Find out more about
SMARTSCAN:
iba-dosimetry.com

**PROTECT +
ENHANCE +
SAVE LIVES**

Discover the new state of the art in beam commissioning

SMARTSCAN Software

myQA Accept SMARTSCAN
myQA Platform

Automated and guided beam scanning

SMARTSCAN Water Phantom System

SMARTSCAN 3D Water Phantom
Slanted bottom
Micro-leveling frame

Scanning volume [L×W×H]: 478 mm × 478 mm × 410 mm
Position accuracy/reproducibility: +/- 0.1mm/ 0.1mm
Position resolution: 0.1mm
Scanning speed: 25mm/sec
Volume [approx.]: 200 liters

SMARTSCAN CCU electrometer

Input: Two independent signal inputs
Bias voltage: +/- 50V through +/- 500V
Leakage: < 200fA, typically < 20fAV
Ranges: 400pA, 40nA, 4µA

SMARTSCAN Lift Table
*Telescopic legs extendable
up to 180cm*

Maximum load capacity: 250 kg
Vertical range/speed: 660-1180mm / 13mm/sec
Table size: 680mm×680mm, thickness 19mm

SMARTSCAN Water Reservoir
with accessory storage

Pump capacity: Max. 40l/min.
Pump: DC motor 24V, 750W, bi-directional
Tank volume: 208 liters

Detectors

Reference chambers

Stealth Chamber

"Beam-invisible" reference chamber
Small and medium field sizes:
0.5cm×0.5cm to 15cm×15cm [max.]
Mounted at the LINAC head

CC13 air ionization chamber

Field sizes: > 15cm×15cm to 40cm×40cm
Air-vented ionization chamber
Cavity volume: 0.13 cm³

Recommended field chambers

CC04

Air-vented ionization chamber
Cavity volume: 0.04 cm³

RAZOR DIODE DETECTOR

Unshielded detector
Chip size: 0.96mm×0.95mm
Sensitive area diameter: 0.6mm

RAZOR CHAMBER

Air-vented ionization chamber
Cavity volume: 0.01 cm³

RAZOR NANO CHAMBER

Air-vented ionization chamber
Cavity volume: 0.003 cm³

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Technical specifications and product features are subject to change without prior notice.

IBA Dosimetry

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