

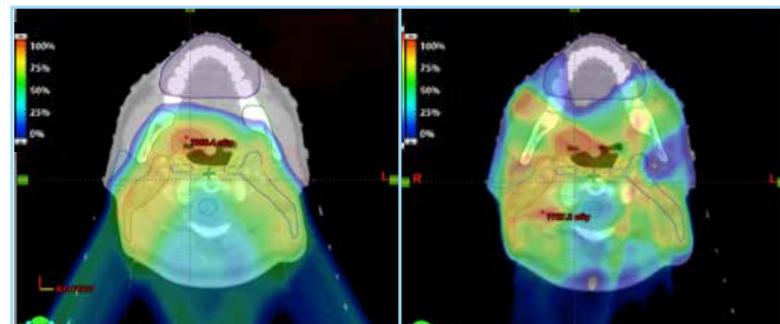


# PROTON THERAPY. A TRUE SUCCESS IN CANCER CARE

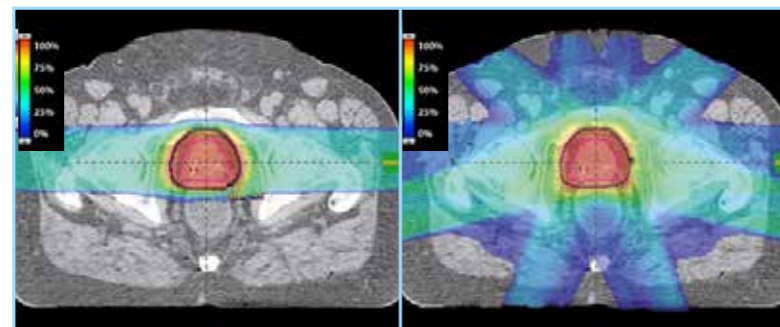
Proton therapy is used today to treat many cancers and is particularly appropriate in situations where treatment options are limited or conventional radiotherapy presents an unacceptable risk to the patient.

These situations include eye and brain cancers, tumors close to the brain stem, spinal cord or other vital organs, prostate cancers, recurring cancers and pediatric cancers.

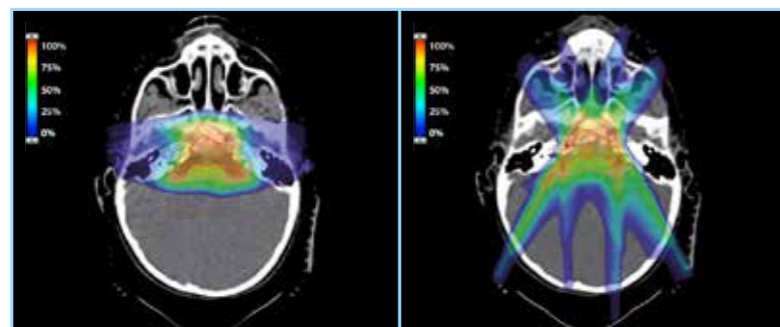
## Proton therapy vs X-ray radiation



HEAD AND NECK



PROSTATE CARCINOMA



PEDIATRIC CHORDOMA

Images with the courtesy of Stefan Both, Ph D.

PENN RADIATION ONCOLOGY  
Penn Medicine

For a general overview of the clinical aspects of proton therapy, refer to the following works:  
- "Proton and charged particle radiotherapy" by Thomas F. Delaney, Hanne M. Kooy  
- "Proton Therapy", Series: Radiation Medicine Rounds Volume 1 Issue 3 by James M. Metz and Charles R. Thomas, Jr.

# Proteus<sup>®</sup>ONE

## ProteusONE, proton therapy made easy

ProteusONE is IBA's **compact** single-room proton therapy solution that can be integrated easily into many kinds of healthcare settings. Much smaller and more affordable than conventional multi-room proton systems, but with the same clinical applications, ProteusONE makes proton therapy more accessible to clinical institutions worldwide and to their cancer patients.

Benefiting from IBA's unrivalled experience in proton therapy, ProteusONE delivers the latest advance in proton radiation therapy, **Intensity Modulated Proton Therapy (IMPT)**. IMPT combines the precise dose delivery of Pencil Beam Scanning (PBS) with the dimensionally accurate imaging of 3D Cone Beam Computed Tomography (CBCT)\*, enabling physicians to truly track where protons will be targeting tumor cells.

ProteusONE was inspired by everyday clinical practice. Its patient-centered design was developed in collaboration with Philips Healthcare to foster a soothing patient environment while helping the medical staff work more efficiently.

The powerful combination of smaller system size, clinical capabilities and patient-centered design is why ProteusONE is being adopted by more community-based and advanced institutions around the world.

\* CBCT and 220° Compact Gantry are ongoing developments. The marketing approval will be subject to review by competent authorities (FDA, Notified bodies, et al...)



# TREATING WITH *Proteus*<sup>®</sup> **ONE**

IBA's *ProteusONE* is a compact single room proton therapy solution offering all the clinical capabilities of a conventional multi-room proton system, including IMPT, the latest advance in proton treatment methods.

IMPT lets radiation oncologists adjust the precision, depth and intensity of a proton beam to the peaks and valleys of complex tumors while sparing nearby healthy tissue. Tumors like these are typically found in the neck, head and spine. The precision and adaptability of IMPT makes it particularly well suited for treating tumors that are adjacent to vital organs.

*ProteusONE* enables IMPT by combining the fine precision of the Pencil Beam Scanning delivery mode with the accuracy of 3D Cone-Beam Computed Tomography (CBCT)\* imaging.

TREATING WITH IMPT

DELIVERING THE BEAM TO THE NEAREST MILLIMETER

TOWARDS ADAPTIVE IMAGE GUIDED PROTON THERAPY



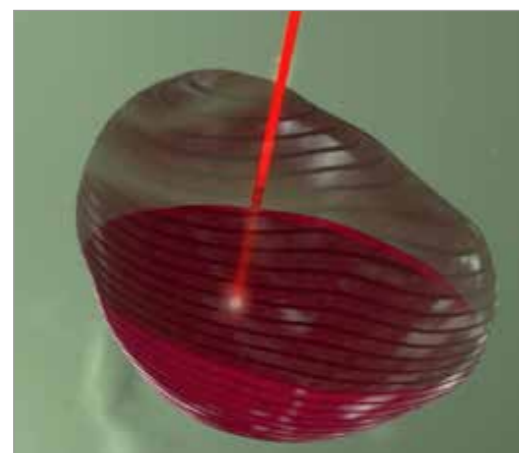
\* CBCT and 220° Compact Gantry are ongoing developments. The marketing approval will be subject to review by competent authorities (FDA, Notified bodies, et al...)

## TREATING WITH INTENSITY MODULATED PROTON THERAPY

*ProteusONE* delivers the proton beam to the tumor using the Pencil Beam Scanning (PBS) modality.

Thanks to its advanced technical and clinical capabilities, PBS enables a clinician's delivery of Intensity Modulated Proton Therapy to cancer patients. IMPT precisely targets the tumor while controlling the intensity and spatial distribution of the dose with fine precision.

With *ProteusONE* IMPT capabilities, you will have the ability to precisely model the dose on the target tumor, reaching high levels of conformality and dose uniformity, especially for complex tumors, with fewer treatment beams.



### WHAT IS PENCIL BEAM SCANNING ?

PBS is a proton beam delivery mode. The proton beam paints the target volume, one layer at a time, pixel by pixel, to precisely match the shape of the tumor. IMPT treats a small section of the tumor at a time, adjusting the proton beam dose and depth to wider and narrower contours of the tumor, section by section. Combined with the appropriate imaging devices and treatment strategies, IMPT is capable of treating moving tumors.

The key advantages of PBS:

- It sculpts the dose with very high levels of conformality and dose uniformity, even in complex-shaped tumors, thanks to its fine precision.
- It enables Intensity Modulated Proton Therapy (IMPT).
- It makes treatment planning easier, while eliminating the need for individualized aperture and compensator devices.
- It delivers the smallest possible neutron dose to the patient during treatment.

*"At the Willis-Knighton Cancer Center in Shreveport, LA, we wanted to offer the latest form of proton therapy, pencil beam scanning, while taking advantage of advances in image guidance and remaining within the budget of our hospital system.*

*We needed assurances that our partner had experience in designing, installing, and maintaining a proton therapy facility but had also had the financial strength to invest in research and development for the future.*

*IBA has continually demonstrated innovation in the field of proton therapy and they were chosen for their unique ability to meet our department needs."*

**Lane R Rosen MD**

*Director of Radiation Oncology, Willis Knighton Cancer Center*

**adapt** Treatment Suite

### DELIVER ACCURATE PROTON TREATMENTS WITH EASE

IBA presents its integrated proton therapy software suite, **adapt** Treatment Suite.

This modular software platform is proposing a truly integrated treatment environment for safe and efficient proton therapy delivery.

**adapt** **deliver** is the front-end of the treatment delivery. It incorporates the different delivery techniques, such as Pencil Beam Scanning, and it offers ergonomic screens for streamlined control of the patient treatment, along with full integration of the TPS and OIS through DICOM connectivity.

**adapt** **prescribe** allows editing of treatment plans and prescriptions for standalone or QA modes.



## DELIVERING THE BEAM TO THE NEAREST MILLIMETER

*ProteusONE* brings together the most advanced techniques of patient positioning for proton therapy treatments. It enables your treatment procedures to optimize proton beam precision — in dose, depth and contour. Developed over the years by IBA and our clinical partners, our proton beam technology has proven successful in delivering the proton beam with fine precision.

### ROBOTIC PATIENT POSITIONING SYSTEM

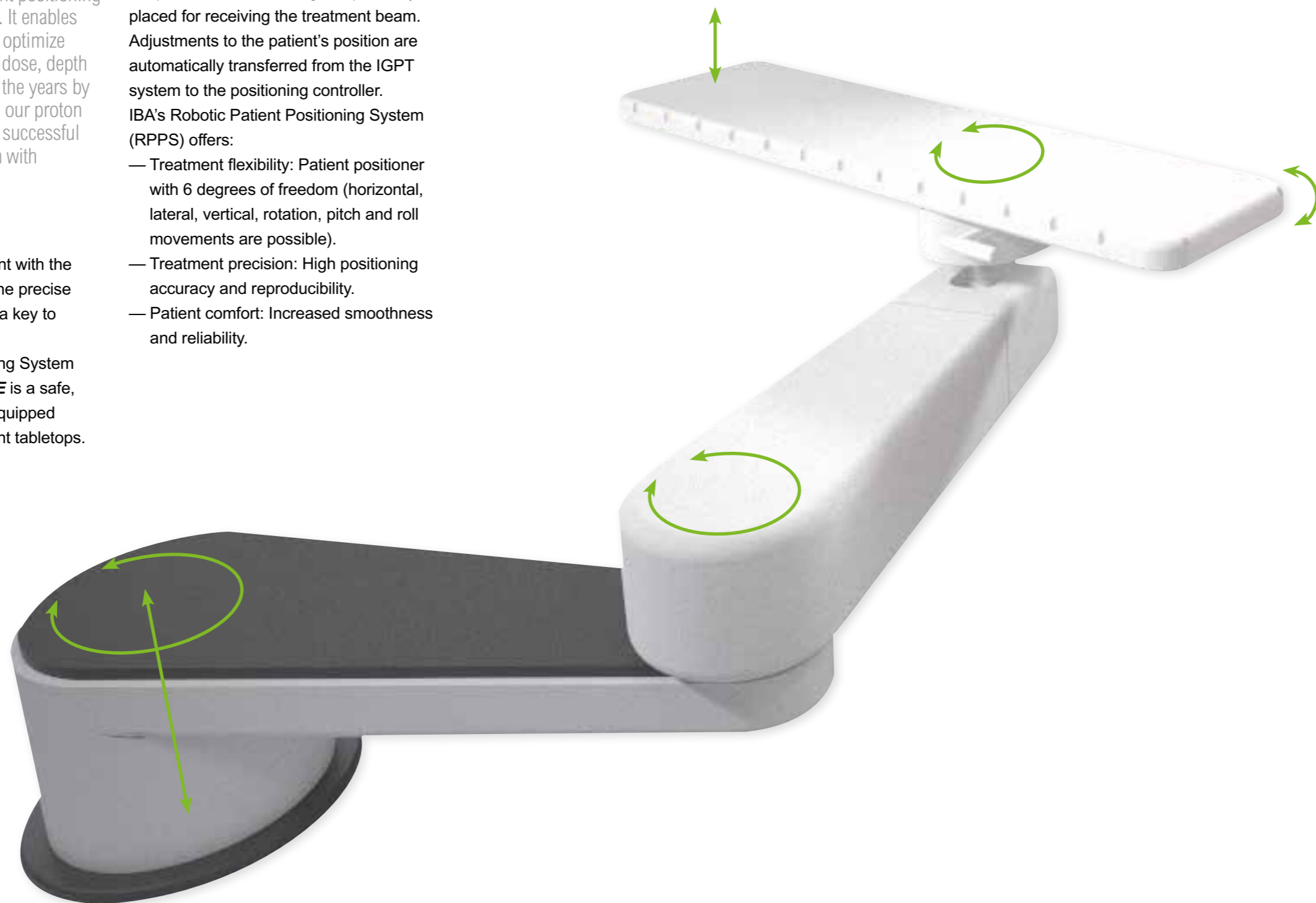
Properly positioning the patient with the utmost care while to ensure the precise delivery of proton fractions is a key to clinical effectiveness.

The Robotic Patient Positioning System incorporated into *ProteusONE* is a safe, robust and accurate device equipped with interchangeable treatment tabletops.

Its smooth, deliberate motion positions the patient so that the target is precisely placed for receiving the treatment beam. Adjustments to the patient's position are automatically transferred from the IGPT system to the positioning controller.

IBA's Robotic Patient Positioning System (RPPS) offers:

- Treatment flexibility: Patient positioner with 6 degrees of freedom (horizontal, lateral, vertical, rotation, pitch and roll movements are possible).
- Treatment precision: High positioning accuracy and reproducibility.
- Patient comfort: Increased smoothness and reliability.





# TOWARDS ADAPTIVE IMAGE GUIDED PROTON THERAPY

IBA's *ProteusONE* incorporates the latest imaging technologies so clinicians can deliver Image-Guided Proton Therapy (IGPT) to cancer patients. IGPT relies on high-resolution and high-sensitivity X-Ray digital imaging systems that provide low-dose stereoscopic and 3D imaging in various geometrical arrangements.

The advanced imaging technologies integrated in *ProteusONE* ensure quick and accurate patient position verification by comparison with diagnostic CT imaged during the treatment planning process.

## 2.5D ORTHOGONAL X-RAY AND FLUOROSCOPY\*\*

Oblique stereoscopic X-Ray imaging and fluoroscopy allow accurate patient position verification and monitoring.

Fluoroscopy is an imaging technique that produces a real-time x-ray video of internal body structures. The system enables the medical staff to observe the position of the tumor relative to the treatment target area during treatment. For clinical indications that are sensitive to movements of the patient's organs, fluoroscopy enables direct intra-fraction motion monitoring.

## 3D CONE-BEAM CT\*\*\* IMAGE-GUIDED PROTON THERAPY (IGPT)

3D volumetric X-Ray imaging, Cone-Beam Computed Tomography (CBCT), can be directly acquired in the treatment room at isocenter. It can then be compared with treatment planning CT for patient position verification and anatomical modification assessment.

Advanced acquisition software, shading correction, accelerated inline and offline image reconstruction algorithms support high-speed, high-resolution, uniform and low-dose CBCT.

CBCT offers excellent soft-tissue contrast, providing much more information than a conventional stereoscopic alignment system, and allowing more accurate patient

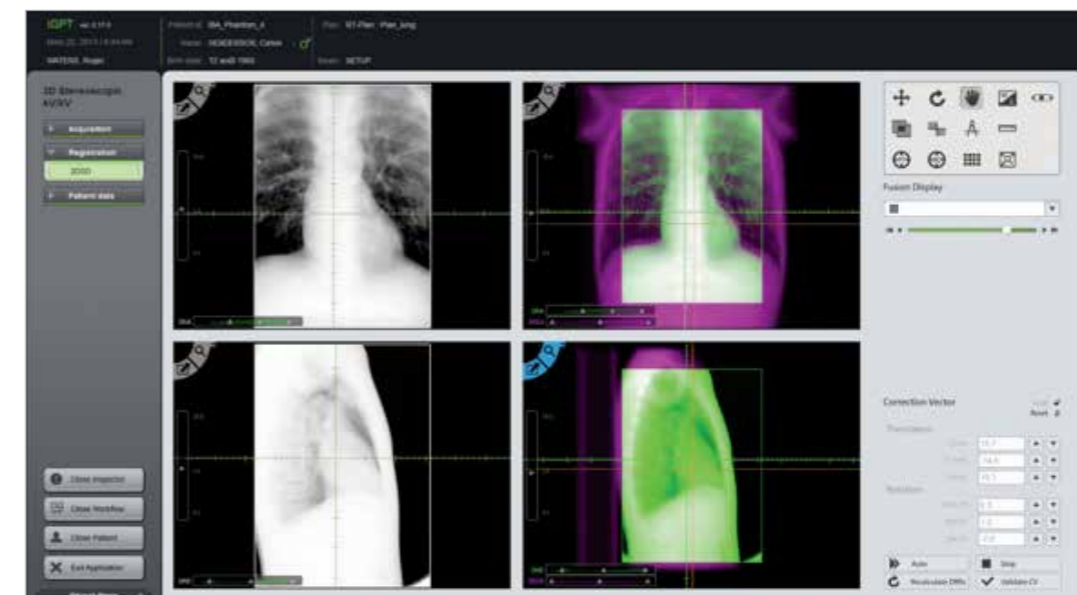
treatment through anatomical modification assessment, the first step towards adaptive radiation therapy.

With the advanced imaging technologies built into *ProteusONE*, clinical users can now apply similar advanced positioning and Quality Assurance protocols as those used in their Image-Guided Radiation Therapy (IGRT) practice.

IBA's *ProteusONE* brings the advantages of:

- Acquiring CBCT image in room and at isocenter.
- Ensuring accurate patient positioning during treatment.
- Enabling the detection of anatomic modifications within the patient along the radiological path.

**adapt insight**\* is the IBA imaging platform. It is part of IBA's integrated proton therapy software suite, **adapt Treatment Suite**. It incorporates image-guidance features such as 3D CBCT\*\*\* and stereoscopic X-Ray imaging for highly accurate patient treatment, as well as tight integration with **adapt deliver**. An open architecture and programmable workflow configurability builds a solid foundation for the development of future proton specific image-guided solutions.



\*The marketing approval will be subject to review by competent authorities (FDA, Notified bodies, et al...)

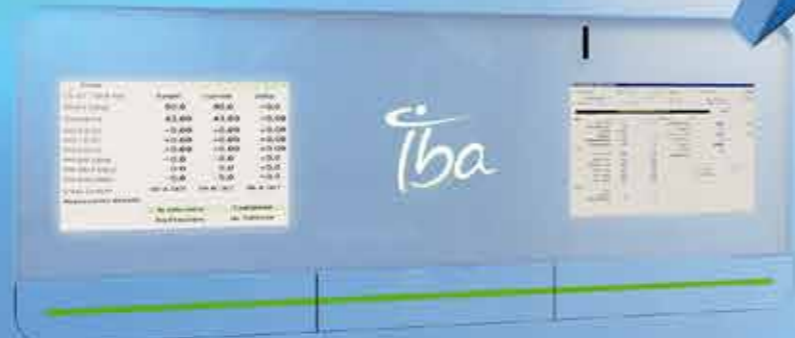
\*\* Fluoroscopy is CE marked.

\*\*\* CBCT and 220° Compact Gantry are ongoing developments. The marketing approval will be subject to review by competent authorities (FDA, Notified bodies, et al...)

# A DESIGN INSPIRED BY CLINICAL CARE

Working with clinicians and nurses in the development of proton therapy worldwide over the last 25 years has led IBA to understand that successful treatment does not just depend upon the successful application of proton beam physics. The everyday treatment experience is also important — for the patient and clinician.

*ProteusONE* is designed to enhance the patient experience by fostering a soothing environment. At the same time, all care has been taken to facilitate medical staff daily practice.



OPTIMIZED STAFF EXPERIENCE  
TURNING HEALTHCARE INTO HUMAN CARE



## OPTIMIZED STAFF EXPERIENCE



### OPEN TREATMENT ENCLOSURE \*

*ProteusONE* is designed with an open treatment enclosure. It allows the physicians and nurses to have easy access to the patient during positioning, imaging and treatment. This facilitates patient care and comfort, and improves positioning procedures especially during non-coplanar treatments.

### GANTRY ROLLING FLOOR (GRF)

Thanks to the highly functional design of our Gantry Rolling Floor (GRF), the patient remains very accessible to the treatment

staff as the gantry rotates around the isocenter (220°). The GRF ensures staff safety during clinical operations, allowing them to focus on their core tasks and tend to patient wellbeing.

### IN-ROOM IMAGING CONTROL

*ProteusONE* permits radiation therapists and clinicians to access and control patient imaging from inside the treatment room. This permits improved patient care, greater ease of use and efficient patient positioning.

## TURNING HEALTHCARE INTO HUMAN CARE



While focusing on clinical efficiency and interoperability, *ProteusONE* also incorporates environmental features to help keep patients relaxed and comfortable during imaging and treatment.

Based on insights from proton patients, healthcare staff and experts, Philips Healthcare and IBA integrated a solution that improves the overall patient and staff experience; turning a cold, impersonal environment into one that comforts and reassures. The Philips Ambient Experience, designed specifically for *ProteusONE*, integrates technology, spatial design and workflow improvements to create comfortable, stress-reducing environments.

### BENEFITS OF AMBIENT EXPERIENCE

- For the patients and families:
  - Reduced anxiety and increased comfort.
  - Higher patient satisfaction.
- For the staff:
  - Increased working comfort.
  - Better patient interaction.
  - Higher job effectiveness with improved staff experience and satisfaction.
- For the hospital management:
  - Improved workflow and throughput.
  - Improved patient satisfaction leading to word-of-mouth endorsement.
  - Attracting and retaining highly trained clinical staff and reducing overhead costs.



### AMBIENT EXPERIENCE IN FIGURES\*

- 76% increase in staff satisfaction
- 4% overall decrease in procedure duration
- 6% overall patient increase

\* Philips installed base survey "What do our customers say", 100 customers interviewed, 27 countries (excl. NA) in September 2011.

\* CBCT and 220° Compact Gantry are ongoing developments. The marketing approval will be subject to review by competent authorities (FDA, Notified bodies, et al...)



# PROTON THERAPY MADE COMPACT

Through the development of proton therapy projects worldwide with many different clinical institutions, IBA has learned that the biggest challenge is neither advancing this leading-edge technology, nor convincing clinicians of its clinical effectiveness. The biggest challenge is making this vital technology accessible to more cancer patients around the world.

This is the challenge that IBA has taken on.

*ProteusONE* is our response — a proton therapy system that is smaller, more affordable, easier to install, easier to operate and ultimately easier to finance.

With *ProteusONE*, the power of protons is possible for more patients worldwide.

WHEN SIZE MATTERS  
WHEN IT COMES TO TIME AND MONEY

## WHEN SIZE MATTERS

In many areas, size matters. This is particularly true in a high-tech medical facility where every square foot is invaluable. There is a common misconception that proton therapy requires a large — and costly — facility in which to operate. As a consequence, too many facility executives look at the space and capital they have available and quickly deem a proton center to be impossible.

The IBA team has worked relentlessly to prove this belief to be false.

The result is *ProteusONE*: a proton therapy solution with a footprint limited to the size of two typical linac vaults.

### COMPACT ACCELERATION WITH MINIMAL NEUTRON DOSE

Acceleration of the proton beam in *ProteusONE* is performed by IBA's specially designed Superconducting Synchro-Cyclotron. This technology reduces the accelerator weight and energy consumption by a factor of four.

In order to ensure the safest treatment at all time, the scanning controller performs 1 million measurements per second, allowing to take **60,000 safety decisions per second**.

Our compact accelerator is mounted outside of the treatment room which dramatically reduces neutron exposure.

On average, it releases **7 times less neutron dose to the surrounding healthy tissues** compared to a Scattering Gantry Mounted accelerator\*.



COMPACT SYNCHRO-CYCLOTRON

220° COMPACT GANTRY TREATMENT ROOM

### 220° OF TREATMENT FREEDOM FOR IMPROVED PATIENT AND STAFF EXPERIENCE

IBA offers the first compact gantry\*\* on the market that extends the treatment angle to 220°. In doing so, your clinicians benefit from 220° of treatment freedom and uncompromised treatment options. The open treatment enclosure allows physicians and nurses to have easy access to the patient in treatment position. This facilitates patient care and comfort, and improves positioning procedures especially during non-coplanar treatments.

The IBA 220° Compact Gantry provides the perfect equilibrium associating the strength, reliability and speed in a compact and patient-friendly treatment solution.

The IBA Open Compact Gantry Treatment Room combines a compact gantry design with the following advantages:

- Optimized access and comfort for patients and staff.
- Accurate patient positioning systems.
- Reduced cost and shorter installation time.

\* Based on Monte Carlo Simulations.

\*\* CBCT and 220° Compact Gantry are ongoing developments. The marketing approval will be subject to review by competent authorities (FDA, Notified bodies, et al...).



# LEADING INSTITUTIONS HAVE ALREADY CHOSEN IBA. JOIN THEM TO DEVELOP THE FUTURE OF CANCER CARE TOGETHER

## STAY FOCUSED ON PATIENT CARE, WE CAN RUN THE SYSTEM FOR YOU

Our experience installing proton systems at more than half of the clinical proton therapy centers worldwide has led us to understand the worries and clinical complexities that arise when treating cancer.

Our commitment is to ensure your clinical success by providing reliable systems with the highest availability possible — over 95% uptime. The dependability and reliability of IBA proton systems means you can schedule patient treatments — and necessary clinical staff — with confidence.

To date, being part of the IBA proton therapy client network and benefiting from our technical expertise has helped centers around the world to treat over 25,000 cancer patients worldwide.

Your team can focus on the clinical aspects of cancer care while IBA's team keeps your proton therapy system running at top performance and meets the highest safety and reliability standards.

## OPERATION AND MAINTENANCE SERVICES IN A NUTSHELL

With the largest team of proton experts around the world, you can have access to our qualified field support team at any time, day and night. In addition to personalized support, other key services are provided:

- 24/7 remote support service, online or over the phone, is an important component to keep your equipment's high uptime.
- A team of IBA trained specialists will operate the system onsite to ensure the highest level of availability for clinical treatment.
- In case of emergency, we can deliver spare parts the same day via our extensive spare parts worldwide network with hubs in America, Asia and Europe.
- Because technology changes quickly, IBA develops both update and upgrade packages tailored to your center's configuration and training programs to increase your team's efficiency.

### NEW SERVICE FEATURES INCLUDE:

- Remote Service Connections to proton therapy accelerator systems;
- Worldwide Computerized Maintenance Management Systems.

*"IBA has placed an extraordinary number of staff locally to assure the process remains fluid. They have demonstrated that they can efficiently deliver this support within our hospital budget.*

*We are confident that IBA will assist with the operation and maintenance of our facility in the same manner in which they have behaved thus far."*

**Lane R Rosen MD**  
Director of Radiation Oncology,  
Willis Knighton Cancer Center



# IBA HAS DESIGNED AND INSTALLED THE MAJORITY OF CLINICALLY OPERATING PROTON THERAPY CENTERS IN THE WORLD.

25+ YEARS OF EXPERIENCE

25+ PROTON THERAPY PROJECTS DEVELOPED

25,000+ PATIENTS TREATED



## NORTH AMERICA NETWORK



**CDH PROTON THERAPY CENTER, A PROCURE CENTER**  
Warrenville, IL, USA  
*Treating since 2010*



**UNIVERSITY OF PENNSYLVANIA HEALTH SYSTEM ROBERTS PROTON THERAPY CENTER**  
Philadelphia, PA, USA  
*Treating since 2009*



**HAMPTON UNIVERSITY PROTON THERAPY INSTITUTE**  
Hampton, VA, USA  
*Treating since 2010*



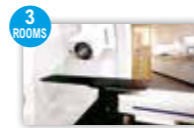
**THE PROTON THERAPY CENTER LLC (TPTC) PROVISION HEALTHCARE**  
Knoxville, TN, USA  
*Opening in 2014*



**WILLIS-KNIGHTON CANCER CENTER**  
Shreveport, LA, USA  
*Opening in 2014*



**PROCURE PROTON THERAPY CENTER IN OKLAHOMA CITY**  
Oklahoma City, OK, USA  
*Treating since 2009*



**MASSACHUSETTS GENERAL HOSPITAL BURR PROTON THERAPY CENTER**  
Boston, MA, USA  
*Treating since 2001*



**SCCA PROTON THERAPY A PROCURE CENTER**  
Seattle, WA, USA  
*Treating since 2013*



**PROCURE PROTON THERAPY CENTER**  
Somerset, NJ, USA  
*Treating since 2012*



**UNIVERSITY OF FLORIDA PROTON THERAPY INSTITUTE**  
Jacksonville, FL, USA  
*Treating since 2006*



**TEXAS CENTER FOR PROTON THERAPY**  
Dallas, TX, USA  
*Opening in 2015*



**INDIANA UNIVERSITY HEALTH PROTON THERAPY CENTER**  
Bloomington, IN, USA  
*Treating since 2004*



## EUROPE NETWORK



**WESTDEUTSCHES PROTONENTHERAPIEZENTRUM ESSEN (WPE)**  
Essen, Germany  
*Treating since 2013*



**AGENZIA PROVINCIALE PER LA PROTONTERAPIA (ATREP)**  
Trento, Italy  
*Opening in 2013*



**CENTRE ANTOINE LACASSAGNE**  
Nice, France  
*Opening in 2015*



**BRONOWICE CYCLOTRON CENTER**  
Kraków, Poland  
*Treating since 2013*



**FEDERAL HIGH-TECH MEDICAL CENTER**  
Dimitrovgrad, Russia, Europe  
*Opening in 2015*



**PROTON THERAPY CENTER CZECH S.R.O.**  
Prague, Czech Republic  
*Treating since 2012*



**CENTRE DE PROTONTHÉRAPIE DE L'INSTITUT CURIE**  
Paris (Orsay), France  
*Treating since 2009*



**SKANDIONKLINIKEN**  
Uppsala, Sweden  
*Opening in 2015*



**UNIVERSITÄTSKLINIKUM CARL GUSTAV CARUS**  
Dresden, Germany  
*Opening in 2014*



## ASIA NETWORK



**NATIONAL CANCER CENTER**  
Ilsan, Korea  
*Treating since 2007*



**APOLLO PROTON THERAPY CENTER**  
Chennai, India  
*Opening in 2016*



**WANJIE PROTON THERAPY CENTER**  
Zibo, China  
*Treating since 2004*



**CHC TAIPEI PROTON THERAPY CENTER**  
Taipei, Taiwan  
*Opening in 2016*



**NATIONAL CANCER CENTER**  
Kashiwa, Japan  
*Treating since 1998*

● Proteus®PLUS  
● Proteus®ONE

*This map has been last updated in August 2013.*

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*ProteusONE* is the brand name of a new configuration of the Proteus 235 including some new developments subject to review by competent authorities before marketing. Empath is a registered trademark of IBA Particle Therapy.

Adaptinsight is the brand name of I2C, which is subject to review by competent authorities before marketing.

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## IBA PROTON THERAPY

*IBA pioneered the field of proton therapy more than 25 years ago and has since become the worldwide industry leader. In fact, the vast majority of the world's Proton Therapy centers rely on IBA proton beam systems.*

*IBA remains committed to following this path and offering its customers ever more compact, flexible and accessible state-of-the-art proton therapy solutions.*

*Every day, our experts work relentlessly to make this extraordinary treatment modality available to more patients worldwide. Years of collaboration between IBA and our clinical and research partners have enabled more than 25,000 cancer patients worldwide to be treated with the power of protons. Leveraging this experience, IBA has developed a deep understanding of what it takes to design and build a proton therapy center.*

*Our new hospital and clinic partners benefit from a knowledge base of more than 25 years that allowed IBA to significantly reduce the time required to reach "first patient" treatment.*

*Leading institutions have chosen IBA to set up their proton therapy center. Join them to develop the future of cancer care together.*

### VISIT US ONLINE AT:

[www.iba-protontherapy.com](http://www.iba-protontherapy.com)

