

visions

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Taking Interventional Radiology to Infinity and Beyond

08 // INTERVENTIONAL X-RAY

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Aquilion Exceed
LB at RIF

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Canon



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// EDITORIAL

On February 1, 2021, I joined Canon Medical Systems Europe as President and CEO, and as a successor of Mr. Hatakeyama who returned to Japan in his new role. Canon Medical Systems Europe is a great company with highly passionate, knowledgeable and committed employees. Even now, in these difficult times of a global pandemic, customers remain at the very heart of all business activities and every effort is being made to serve them well and adequately.

For more than 27 years, I have been deeply involved in engineering, product and business management. A few examples are the development and launch of the Aplio i-Series: intuitive, intelligent and innovative ultrasound systems designed to deliver excellent clinical precision and departmental productivity, as well as various 'world-first-technologies' in close collaboration with European customers.

Looking to our market, unfortunately the coronavirus will continue to challenge us in 2021. However, at Canon Medical, we remain committed to the safety and security of society and strive to minimize the impact of the COVID-19 outbreak, while maintaining customer service at the highest level for the benefit of the patients.

Despite a very challenging business environment in 2020, we continued to grow, especially in COVID-19-driven modalities, like CT, Diagnostic X-Ray and Ultrasound. In parallel, we also continued to focus and to support healthcare professional in their heavy workload of reducing waiting lists of non-COVID-19 patients. Our clinical solutions with integrated AI are proving a massive support not only for clinicians, but also for patients.

Based on our Made for Life philosophy, we will continue to support the entire healthcare society also this year with an even larger mobile fleet of clinical solutions. All of them equipped with state-of-the-art equipment to support hospitals with their extremely high workloads.

A lot of investments were made to bring our company to the highest level of digitalization. However, even with the remote connections to our systems rapidly increasing bringing a lot of advantages for our customers and our own efficiency, we will always need great people to provide the best support to our customers. I am very proud of our employees for their extraordinary commitment and dedication, even more in this difficult period.

You have our strengthened commitment during this challenging period, that we will continue to move forward together in close collaboration with our valued customers, regardless of whatever conditions or challenges.

Kind regards,

MR. TETSUYA KAWAGISHI

President and CEO

Canon Medical Systems Europe

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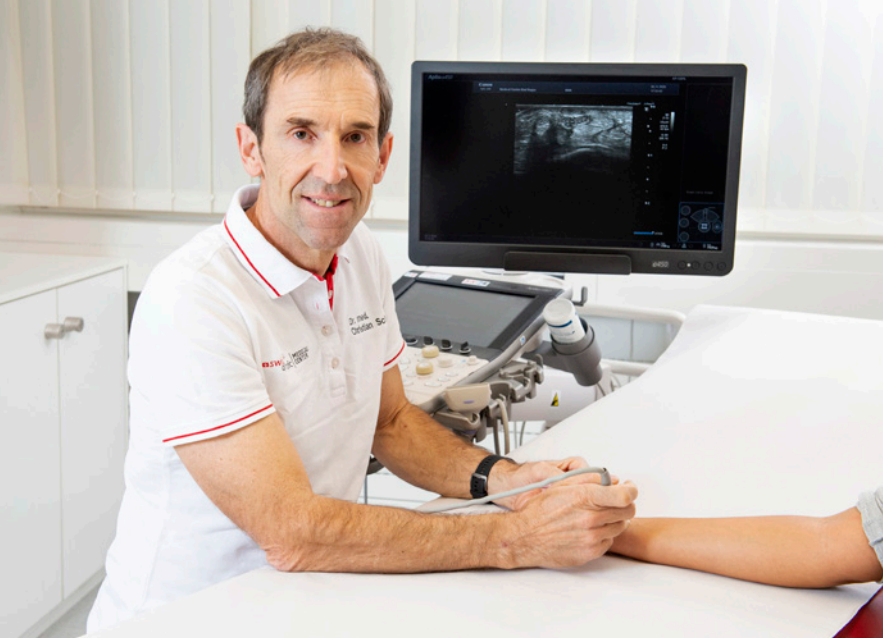
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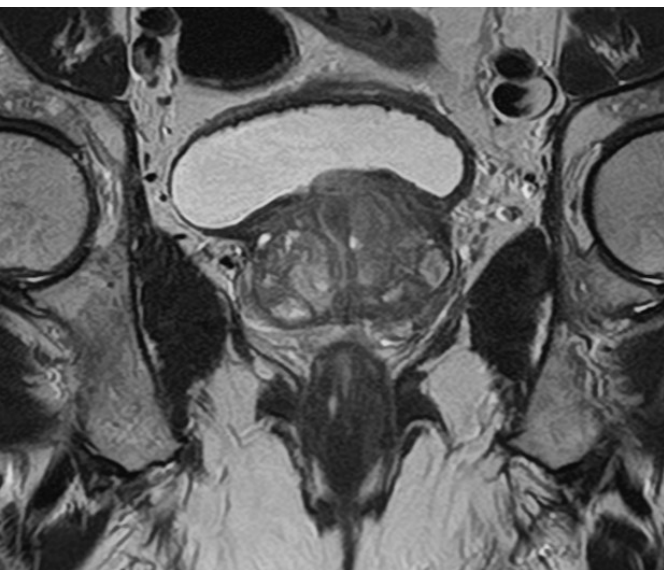
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Canon Medical's Education & Experience Center Now Includes the Alphenix 4D CT

Canon Medical's European Headquarters, in Zoetermeer, The Netherlands, has extended its Education & Experience Center capabilities with the inauguration of a new Alphenix 4D CT room. This unique Angio-CT room has been equipped with an Alphenix Sky + C-arm to carry out interventional procedures together with a high-performance Aquilion Prime SP CT scanner. This innovative pairing enables customers to diagnose, plan, treat and verify in a cost-effective setting without the need to move the patient.



The new Alphenix 4D CT room at the Canon Medical Education & Experience Center.



Left: Erwan Ladsous, European Director Interventional X-Ray, Canon Medical Systems Europe. Right: René Degros, Vice President, Canon Medical Systems Europe.

Towards becoming a center of global excellence for 4D CT, Canon Medical has made a significant investment in this new Angio-CT suite. Training programs for customers will be hosted in

the suite, as well as commercial and clinical presentations.

The suite and systems within it enable streamlined workflow and an outstanding range of patient access and coverage. //

Alphenix 4D CT Advantages:

- Unprecedented flexibility with innovative C-arm flip, right- or left lateral flexibility, speed, and full body 3D-imaging capability.
- Outstanding patient access, enabling clinicians to move the system, not the patient.
- DoseRite technology designed to help clinicians minimize patient radiation dose, while maintaining optimal image quality.
- Boosted productivity with the new Alphenix workstation, which integrates applications to help clinicians plan, analyze and perform interventional procedures.
- Greater control for the clinician with the optional tableside tablet, to deliver a fast, seamless and rich workflow experience.

“The Alphenix 4D CT in the new Education & Experience Center represents our dedication in investing in an innovative multi-modality solution that will improve clinical outcomes, lead to workflow optimization, patient outcome and increased cost efficiency.”

Erwan Ladsous, European Director Interventional X-Ray, Canon Medical Systems Europe.



From left to right: Dr. Raphaël Leveque, Dr. Bénédicte Heynen, M. François Conti (Chief Radiographer), Dr. Paul Desclée (Chief Radiologist), Dr. Manuel Mignon.



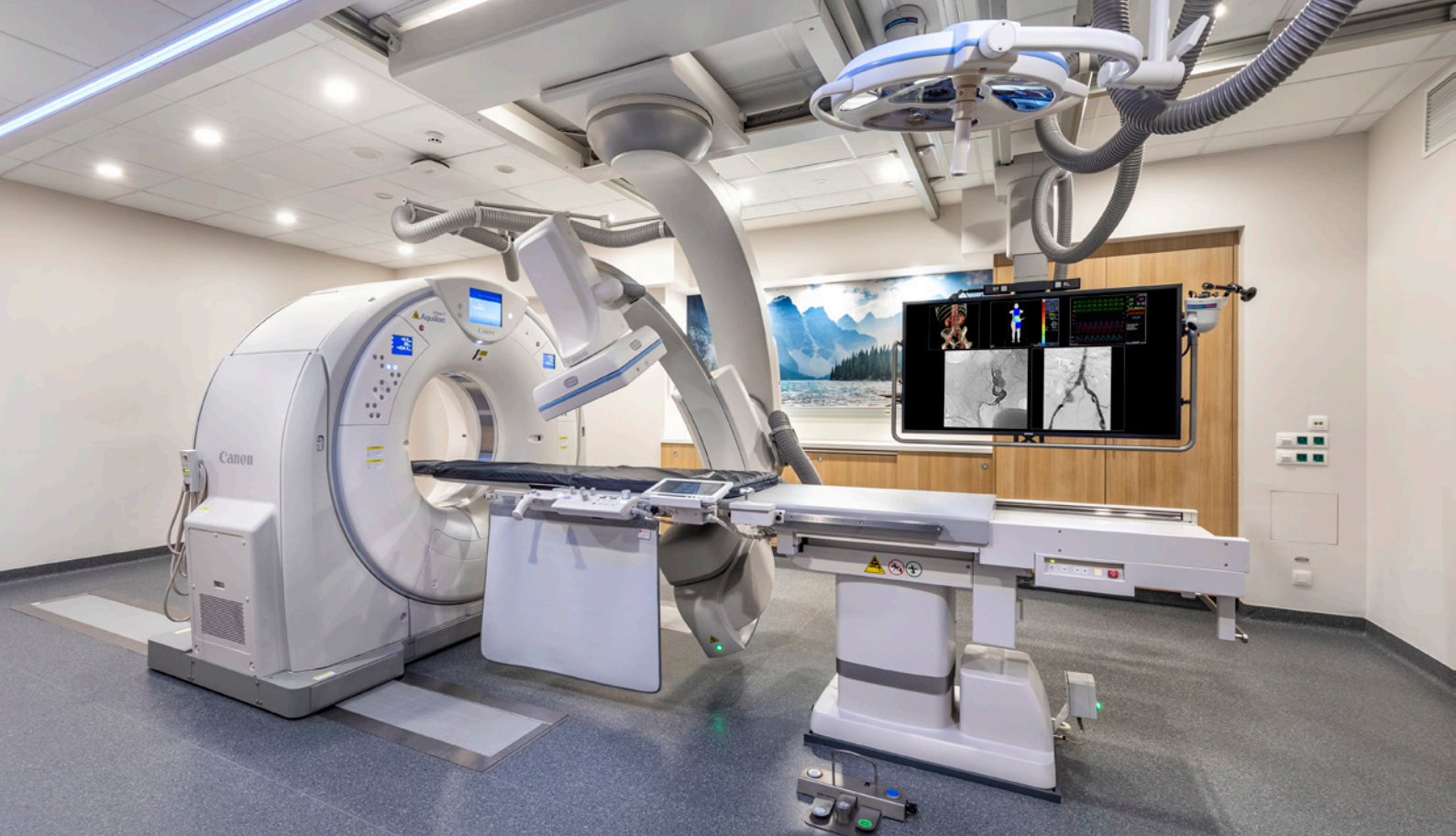
Interview with Jolimont Hospital in Belgium, sharing their experiences with the Alphenix 4D CT.

Jolimont Hospital is located in La Louvière, Belgium. The radiology service cares for about 500 patients per day, except in covid times, and is equipped with three CT scanners, one PET CT scanner, two MRI scanners and the Alphenix 4D CT.

Taking Interventional Radiology to Infinity and Beyond

Interventional radiology at Jolimont Hospital in Belgium has become an aerial experience with the Alphenix 4D CT. The equipment's flexibility and versatility have helped the hospital to improve patient management and productivity, by enabling to provide diagnosis and treatment in the same interventional examination room.

With the investment, Jolimont now stands in the forefront of European interventional radiology (IR), being the first center in Belgium to provide an Angio-CT room. Dr. Paul Desclée, head of the radiology department, and Dr. Manuel Mignon, head of interventional radiology, explained how interventional radiology is living its true life with the system.



“We’ve been positively surprised by this competitive low dose. The scanner provides low radiation and comes with iterative reconstruction as well as DLR. Also, procedures are shorter, so patients are less exposed to radiation dose. Everything is fluid and precise.”

Dr. Paul Desclée, Head of the Radiology Department, Jolimont Hospital, Belgium.

The Interventional Radiology (IR) activity has been expanding recently at Jolimont Hospital, a private structure in the heart of Wallonia, the French-speaking part of Belgium. The center provides IR services to about 15 patients per day, excluding emergencies, with an increasing number of patients from nearby hospitals.

The main challenge for the Jolimont IR team is to carry out their mission within the established timeframe and with limited resources, Dr. Desclée explained. “The waiting list for patients

is rather long because IR has a struggle with patient flow, because IR has a significant shortage of specialists and equipment in Belgium. Fortunately the equipment struggle is solved now here in Jolimont with the installation of the 4D CT from Canon Medical,” he said.

A corner stone for IR

To support the growing demand, the hospital recently purchased the Alphenix 4D CT. Having robust equipment is the basis for delivering optimal care at a greater scale, according to Dr. Desclée. “The new

room is a corner stone to offer better treatments to our patients,” he said. “Compared with traditional IR rooms, the Alphenix 4D CT opens a panel of possibilities, with improved quality, comfort and control.”

The new equipment makes a real difference in the center’s ability to deliver state-of-the-art IR on a regional level. “Any IR service can drain small fluid collections and perform simple biopsies, but with the Alphenix 4D CT we’re going further,” he said. “We now offer more therapeutic interventions



Canon Medical's Alphenix 4D CT.

and indications, and much more specialized, rare interventions on a much wider scale and for the whole region.”

Ever since the room was installed last spring, Jolimont has increased its IR activity by 10 to 20% providing more thermo ablations, interventions in bleeding polytrauma patients, and procedures in the intensive care and post-operative settings.

With the Alphenix 4D CT, the team is more confident when performing complex procedures, according to Dr. Mignon. “We don’t hesitate to perform thermal ablations thanks to the combination of angiography, CT and ultrasound,” he said. “We can easily move from one modality to another during the same procedure.”

The equipment is also ideal to carry out simple Angio-CT guidance to delineate a lesion before and/or after thermal ablation. “We don’t refrain ourselves from doing perfusion studies post-treatment,” he said. “That’s very impressive to have a direct result right after therapy. Before treatment, we can delineate the vessels that feed the tumor, and after we can assess the result

of the intervention. That really boosts our satisfaction and confidence to see that the lesion was properly treated.”

The room also enables Jolimont to participate with unmatched ease and increased confidence in research projects, for example a US study to assess intra-arterial chemotherapy in stage III pancreatic cancer. The trial is the first of its kind to be conducted in Europe and focuses on those cancers that can’t be accessed with conventional surgery.

“We can now intervene in cases that would have been more challenging to tackle in a traditional angio room. We can do TIPS more easily and with a higher level of confidence,” said Dr. Mignon.

“We needed more space and comfort to carry out procedures that can be done in a traditional setting but are more time consuming and tedious,” Dr. Desclée echoed. “With the Alphenix 4D CT, interventional radiology lives its true life.”

An aerial, all-in-one solution that reduces dose

When he describes his experience working with the Alphenix 4D CT,

Dr. Mignon is impressed by its flexibility. “It’s an areal equipment. The room has been well configured and we have this feeling of lightness, of moving from one procedure to the next with incredible ease,” he said.

The team switches from angiography to CT and back again with tremendous speed, using CT for a wide range of procedures from simple epidurals to complex biopsies that involve anesthetists.

The team is unanimous: the Alphenix 4D CT is comfortable and simple to work with, it seamlessly integrates with the system and provides excellent image quality. “Radiographers enjoy the equipment’s simplicity and pertinence,” Dr. Desclée said. “Physicians, radiologists and nurses like having it all: the layout, XXL screens, an examination table that can be moved with ease and precision.”

The Alphenix 4D CT has changed the way the team works, meeting a long-held desire to provide an all-in-one solution. “We’ve always preferred a short circuit, going from point A to point B as soon as possible,” Dr. Mignon said. “We also wanted to offer an all-



From left to right: Ludovic Riedel-Brichaux, Dr. Bénédicte Heynen, Martin Lebrun, Virginie Ramsdonck, François Conti, Leslie Dumst, Dr. Paul Desclée, Mélodie Liemans, Dr. Manuel Mignon, Kevin Hiersoux, Dr. Raphael Levêque and Stéphanie Ziernicki.

in-one service to diagnose and directly move on to treatment without having to move the patient.”

“We had to scan patients at the CT scanner in the hospital and then take them to the interventional room for drainage,” Dr. Desclée added. “Now we can work much faster. As soon as we have a suspicion, we scan and drain right away if needed, all in the same room. It’s much more comfortable for the patient.”

The ability to diagnose and treat almost immediately translates into shorter procedures and a quicker recovery. Timely management of a polytrauma patient with splenic rupture enables to save two to three hours. In the case of an abscess, which is more complicated to drain, early treatment can reduce the patient’s hospital stay by days.

Another major reduction concerns radiation dose, which is significantly

lowered with the Alphenix 4D CT.

“We’ve been positively surprised by this competitive low dose,” Dr. Desclée said. “The scanner provides low radiation and comes with iterative reconstruction as well as Deep Learning Reconstruction (DLR). Also, procedures are shorter, so patients are less exposed to radiation dose. Everything is fluid and precise.”

“We’re happy and much more confident with dose with the efficient combination of Spot Fluoro with angiography,” Dr. Mignon confirmed. “We can target and control patient dose much better. We particularly like this Angio-CT combo to perform chemo and ablations, as well as thermal ablations.”

Love at first sight and in Covid times

It was love at first sight when Dr. Mignon first set his eyes on the machine in Vienna. “My heart skipped a beat,” he recalled. “This was just the kind of equipment that perfectly fitted our way of working.”

“Manuel came back with bright eyes and I just saw it,” Dr. Desclée added.





“We can target and control patient dose much better. We particularly like this Angio-CT combo to perform chemo and ablations, as well as thermal ablations.”

Dr. Manuel Mignon, Head of Interventional Radiology, Jolimont Hospital, Belgium.

“This was the kind of installation we needed for our new premises. We didn’t have to wait for the new building to be built in a few years, we needed the new room right away.”

Hospital management was also convinced of the equipment’s value and jumped in with two feet. The effort has more than paid off, Desclée believes. “We’ve increased our activity with the system, it’s totally cost effective.”

The Alphenix 4D CT was installed last April during the first wave of the Covid-

19 pandemic. In spite of the lockdown restrictions, Canon and Jolimont managed to open the new room every day from 7:30 AM to 8 PM, first to scan Covid patients and then to perform IR procedures as soon as normal hospital activity resumed.

“The room was installed under exceptional circumstances and with an incredible team,” Dr. Mignon said. “I thought we weren’t going to pull this off, that we’d be delayed by six months. But the magic was such that we even managed to do onsite training with

Canon. The whole team felt carried out by the project. Although we’ve been slowed down by two lockdowns in 2020, our activity has exploded.”

Jolimont now plans to hire a fourth and maybe a fifth interventional radiologist to help meet the demand.

Teamwork was key for that success and Canon integrated really well into the hospital, Dr. Mignon believes. “Canon is now part of the team. We feel understood. They can solve all our issues,” he concluded. //



The new Aquilion Exceed LB of Canon Medical Systems has been developed for a quick, smart and accurate CT simulation. With the largest gantry opening in the industry (90 cm), the user can position patients with exceptional precision.

The Aquilion Exceed LB makes use of advanced AI image reconstruction (AiCE) for an accurate depiction of tumors and surrounding critical organs. In combination with a true Field-of-View (FOV) of 70 cm, an extended FOV of 90 cm and a detector scope in the direction of 4 cm, the Aquilion Exceed LB makes the work flow more accurate, faster and more efficient, without making any concessions to the image quality or the reproducibility of the position of the patient.

VISIONS spoke with the Radiotherapeutic Institute Friesland (RIF), an independent institute where radiotherapeutic care is provided in the province of Friesland in The Netherlands.

The world's First Aquilion Exceed LB is Installed at Radiotherapy Institute Friesland

The Aquilion Exceed LB is one of the most advanced CT solutions currently available in the field of radiotherapy. Radiotherapy Institute Friesland, better known as RIF, is an independent institute that provides leading-edge radiotherapy treatment for patients in the province of Friesland and surrounding areas. So it is no coincidence that the world's first Aquilion Exceed LB CT system was installed in Leeuwarden, The Netherlands.

Radiotherapy Physicist Dr. Robert Kaatee says: "It was no coincidence whatsoever when we selected the new Aquilion. For the last 10 years we at RIF have been treating our patients with the predecessor of the Aquilion Exceed LB, the 16-slice Aquilion LB then made by Canon Medical. We worked in close cooperation with the team at Canon Medical, to everyone's satisfaction. So when it was time to replace our CT scanner, we consulted Canon Medical again about a new solution for our institute. This resulted in the Aquilion Exceed LB."

Optimisation through man and machine

As a clinical physicist, Dr. Kaatee plays a pivotal role at RIF. As a subject matter expert, he is 'responsible for the adequate and proper clinical application of medical physics', if his job could be described in one line. In practice this means that Dr. Kaatee applies his knowledge of physics, measuring techniques and the processing and interpretation of measurement data to facilitate the work of the radiotherapist and support the technologists as efficiently as possible.

“The service team of Canon Medical is available whenever you need them.”

Dr. Robert Kaatee, Radiotherapy Physicist.



This well-oiled system of 'man and machine' requires constant consultation and corrective adjustment to optimise the individualised care RIF offers its patients. "However technically advanced the Aquilion Exceed LB is, it is primarily a means for us to realise our aim: the treatment of patients. In my opinion, the crux of the treatment is the team of technologists and clinical physicists. Their expertise and skill in knowing how to use the Aquilion Exceed LB enables me to provide the best radiotherapy," says Radiotherapist Drs. Annelies van

der Geest. "I can be totally confident that this team will configure the equipment in the optimal way for each patient. The possibilities offered by the Aquilion Exceed LB are phenomenal, however no single patient is standard. We therefore constantly focus on the optimisation process."

Individualised care in addition to fantastic functionalities

Dr. Kaatee gives an example that illustrates the individualised care described by Van der Geest. "A tumour is usually depicted on an MRI scan, after which

the dose calculation is carried out on a CT scan. This means that you have to copy the target area, which is depicted on the MRI, to the CT scan. This scan must have excellent image quality, otherwise you cannot check the match and the patient is radiated in an inefficient way. To obtain the best scan and treatment protocols, the excellent image quality of the Aquilion Exceed LB is crucial," says Dr. Kaatee.

Technologists Ragna Dik and Eddy van den Bosch, who are used to working with Canon Medical equipment,



“The possibilities offered by the Aquilion Exceed LB as a standard are phenomenal.”

Drs. Annelies van der Geest, Radiotherapist.



Eddy van den Bosch (Technologist) in the control room of the Aquilion Exceed LB.

also appreciate the very high image quality of the new system. However, the RIF team still manages to introduce improvements in this respect. For example, the team has already optimised the head-neck scans by varying the spatial resolution and by using smart tricks to bring the 4D scans to the level required by RIF. They always think of the ultimate objective of their treatments: to carry out a treatment with the lowest radiation level, while achieving the best possible image quality.

For accurate calculation of the radiation dose, it is essential that the Aquilion Exceed LB has great Hounsfield Unit accuracy, which is achieved through Advanced intelligent Clear-IQ Engine (AiCE) protocols. The measured Hounsfield Units of the various materials in a calibration phantom correspond well with the reference values. Another major advantage of the Aquilion Exceed LB is the fact that the radiation dose of the average scan

has been reduced by a factor of five, for example by applying Deep Learning Reconstruction.

This is an advantage that should not be underestimated, because with radiotherapy, the radiation plan is,

ideally speaking, continually checked and adjusted during the course of radiotherapy treatment if deviation from the original plan becomes too significant. This sometimes requires a new scan. If so, a low radiation dose scan is important for the patient.



Radiotherapeutic Institute Friesland (RIF), The Netherlands.



“The large bore (LB) of 90 cm is an indispensable feature that offers the necessary flexibility.”

Eddy van den Bosch, Technologist.

Amazing reconstruction speed

One of the main advantages in relation to other systems, is the tremendous improvement in reconstruction speed. The reconstructions of the most advanced and frequently used 4D scans are available within a few minutes. It is also because of this time saving that 4D scans can be planned in a more flexible way than before.

The seamless interface with the Varian Respiratory Gating system (RGSC) is also responsible for the increased efficiency of the 4D scans. During a 4D scan, whereby the respiration signal is recorded with the Varian application, the complete signal is passed on, compared to the previous situation whereby only the triggers of the peaks were imported.

The advantage of this is that a good 4D scan can now also be made of patients with slower respiration rates. Even patients with a very slow respiration rate of 10 seconds can be scanned on the Aquilion Exceed LB with great accuracy.

Advantages for the patient

Besides making life easier for the physicians, the Aquilion Exceed LB also makes the treatment more bearable for patients. Radiotherapist Drs. Annelies van der Geest: “For

me as a professional, a feature such as Single Energy Metal Artifact Reduction (SEMAR) is a marvellous way to optimally depict the target area in the most challenging patients. However, our patients are clearly very enthusiastic about the fantastic user experience. This experience is evident in several ways. First of all, we are available when necessary. The greatly reduced reconstruction time is largely responsible for this. Because the reconstruction times are faster we can plan a 4D scan any time of the day.”

Moreover, it is necessary for radiotherapy patients to be positioned for the CT scan in the same way in which they will be radiated. This means that for radiotherapy treatment for breast cancer for example, they have to raise their arms when going into the scanner. For this, the large bore of 90 cm is an indispensable feature that offers the necessary flexibility. “Certainly if the patient is slightly claustrophobic, the advantage is considerable,” says Eddy van den Bosch. “And in this respect the speed of the scanner is also important.”

“RIF is clearly very happy with the new scanner,” concludes Dr. Kaatee, “and the ongoing cooperation with Canon Medical Systems. The connectivity of the Aquilion Exceed LB with

hardware and software solutions such as the Varian RGSC system, Elekta Mosaiq Care Management software and the RayStation treatment planning system is excellent. Our engineers can use the system almost blindfolded.

The Canon Medical service team are available whenever we need them, but we do not really expect to see them with this new CT system. As was the case with our previous scanner, downtime does not apply with the Aquilion Exceed LB.” //



Ragna Dik, Technologist.

PRESIDENT'S MESSAGE



We would like to express our sincere gratitude to you, our valued customers, for your continued support.

I would also like to express my appreciation to healthcare professionals and all others who continue to work on the frontlines of the ongoing COVID-19 pandemic.

In 2020, the entire world was profoundly affected by COVID-19. We have been receiving positive news on clinical application of COVID-19 vaccines, however the situation concerning the spread of COVID-19 remains uncertain, and there is also a serious burden on many healthcare facilities. Based on our sincere commitment to supporting healthcare professionals who continue to work at the forefront of medical practice, we have been working hard to develop and provide total solutions for COVID-19 diagnosis such as CT, X-ray diagnostic systems, diagnostic ultrasound systems, rapid genetic testing systems for the novel coronavirus (SARS-CoV-2), and rapid antigen testing systems.

Although our battle with COVID-19 continues, we must also continue our efforts toward the

evolution of medicine. Last year, we started to manufacture magnets for our MRI systems in-house. This is to strengthening our MRI technologies by integrating companies that focus on developing and manufacturing magnets or that have technologies for achieving stable magnetic fields. We will further expand such efforts to offer solutions that embodies our Made for Life philosophy.

We will continue striving for further growth, with the mind that these changes we face during the COVID-19 pandemic are bringing steps toward further evolution.

I hope that in the “new normal” after COVID, 2021 marks the start of a bright future for us all.

A handwritten signature in red ink that reads "Toshio Takiguchi". The signature is fluid and cursive, written in a professional style.

TOSHIO TAKIGUCHI

*President and Chief Executive Officer
Canon Medical Systems Corporation*

Alphenix Biplane Hi-Def: A Point Where Cutting-Edge Technologies and Fine Art Meet

Dr. Ljubisa Borota, Uppsala University, Sweden

Canon Medical and the Department of Radiology, Uppsala University Hospital, Sweden, will celebrate this November the ten-year anniversary collaborative partnership in our neurointervention laboratory. The relationship between Canon Medical and our section has never been an ordinary supplier-customer relationship. These ten years have been marked by mutual efforts in the development of the biplane system and on work that has focused on an analysis of the unique functionalities of this system. The conclusions of our strategic discussions are implemented by Canon's R & D teams. All challenges have been overcome thanks to energy, motivation and, first of all, the deep mutual respect which was established during the many years of our collaboration. The Alphenix Biplane system that was launched was partly the result of these mutual efforts.

Our work was focused on an analysis of the unique functionalities of the Alphenix system that make it different and superior to other biplane systems. The goal of our analyses was to become familiar with these novel functionalities in order to use them in our daily work

in an optimal way. An additional objective was to publish our observations and the results of analyses in scientific journals. In this way the results of our work received scientific confirmation and became more accessible to practitioners and scientists in the field of neurointervention on a global level.



The Alphenix Biplane with Hi-Def at Uppsala University, Sweden.

Dose saving functionalities

Information regarding the dose delivered to the patient is of key importance to the operator. In all biplane systems except for the Alphenix Biplane, this information is shown in numerical form somewhere on the monitor together with less important information. Based on the research of Bednarek and colleagues¹, Canon has developed a system that shows the area of the body that is exposed to the irradiation. The spectrum of colors in this area changes from dark blue to dark red, indicating delivered skin dose. This 3D model is displayed in the corner of the screen, and, since it is only a 3D color indicator, it keeps the operator continuously updated about the dose without being intrusive.

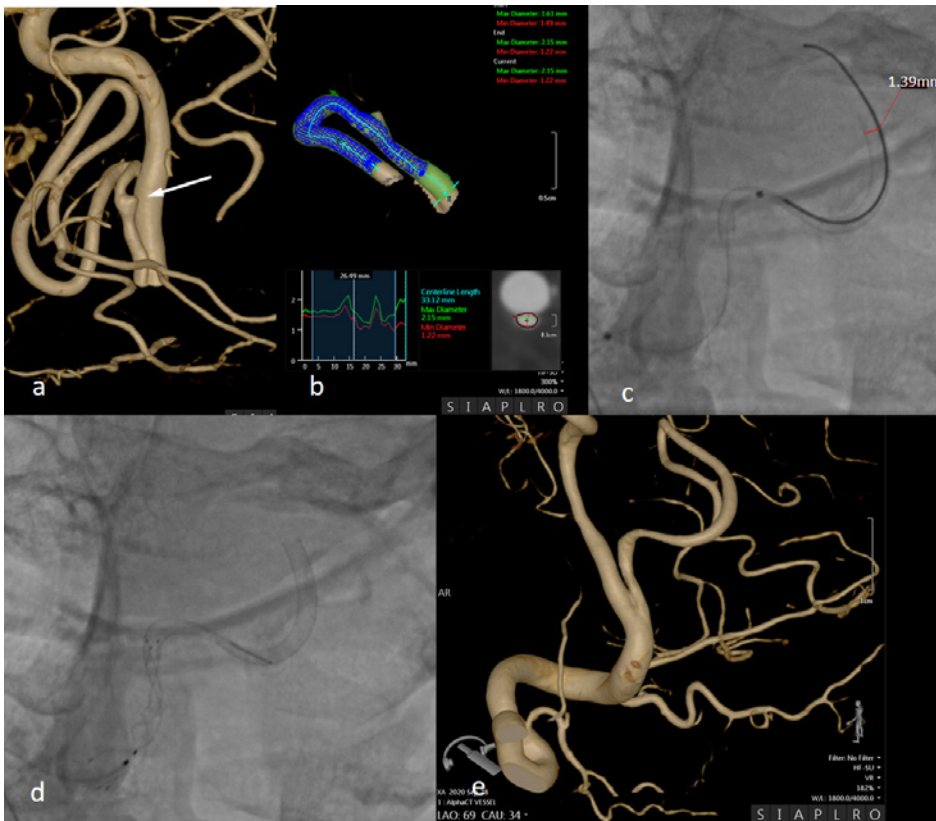


Figure 1:

- 3D reconstruction: dissecting aneurysm (arrow) of posterior inferior cerebellar artery (PICA).
- Virtual stenting indicates that the largest diameter of artery is 2.15 mm and the smallest 1.22 mm.
- High Def: a flow diverting stent is deployed.
- High Def: a second, braided stent is deployed in telescopic fashion in proximal segment of PICA and vertebral artery due to proximal extension of the dissection.
- 3D reconstruction: one week follow-up shows completely reconstructed artery.

Spot Fluoroscopy is a unique technology that enables acentric, asymmetric collimation anywhere within the field of view. The shape (square or rectangle), size or place of the region of interest defined by such collimation can be changed at any time during the intervention, and as many times as the operator needs to do it. Using this functionality, it is possible to adapt the field of view to the anatomy of a vascular target, enabling optimal visualization of the target with the lowest possible dose. We have shown that the dose delivered to a patient by using Spot Fluoroscopy is significantly lower than the dose delivered using conventional collimation².

A similar, dose-sparing functionality referred to as Spot Region of Interest (Spot ROI), which is integrated in the Alphenix Biplane system, offers a square-shaped collimation of the region of interest that is freely movable within the field of view³. Unlike other collimation systems, the field of view outside the region of interest is still visible, which is particularly important in visualization of larger anatomical regions.

Another functionality that distinguishes this machine from any other biplane system is the flexible lateral isocenter. This functionality “enables mobility of the lateral arm in the vertical direction and in this way contributes to the adjustability of the lateral arm and thus to better visualization of vascular structures regardless of their position, size or shape.

Thanks to this novel functionality, it is also possible to obtain the desired projections with the minimal possible distance between the detector plate and X-ray tube.”⁴. A shorter source-detector distance also leads to a dose reduction according to the inverse square law. We have shown that the dose delivered to the target by using a flexible lateral isocenter is significantly lower than the dose delivered to the same target by using a fixed lateral isocenter⁴.

Beyond the imaginable...

Finally, the last jewel in the crown of Alphenix Biplane system is the High Definition (Hi-Def), one more functionality that distinguishes this machine from other biplane machines. The system is equipped with a novel hybrid flat panel detector on each plane that consists of a standard 30x30 detector and a built in 8x8cm High definition detector with a pixel size of 76µm providing 6,5LP/mm resolution. This unique high-resolution mode enables superior visualization of both the smallest anatomical structures and the smallest neurovascular devices. Clinical importance of this functionality has already been confirmed⁵. Manufacturing technology of neurovascular devices has developed tremendously during recent years. The range of sizes of the smallest aneurysms now treatable by endovascular means varies between 1 mm and 3 mm. The diameter of the loop of the smallest coil measures 1 mm and the total length of this coil measures 10 mm. High definition enables visualization of even the secondary structure of these coils.

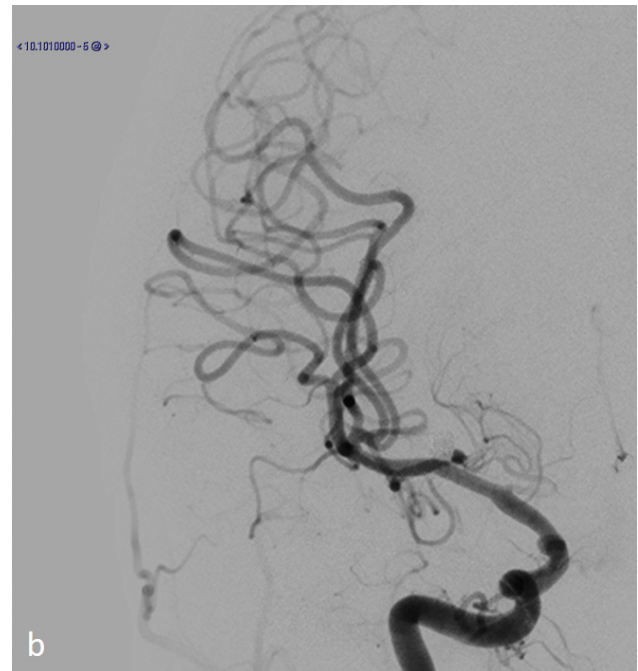
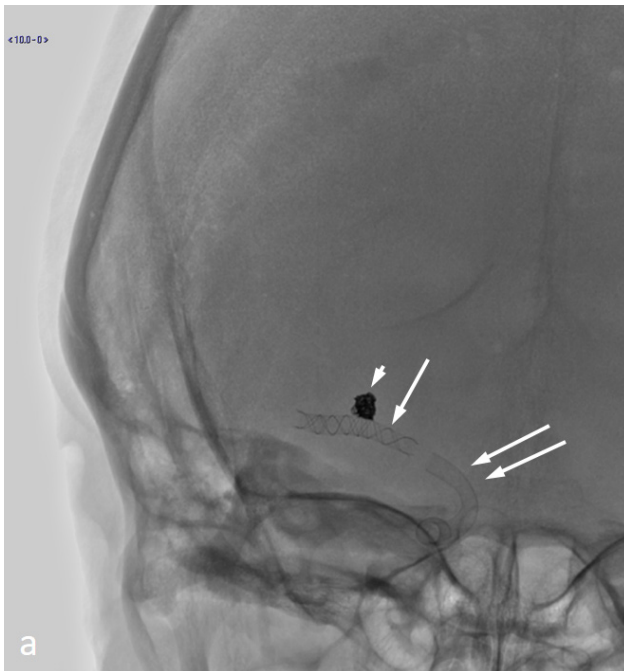


Figure 2:
 a. AP projection, spot image without magnification shows coils in an aneurysm (arrowhead), a flow diverting 2.5 x 25 Silk stent in middle cerebral artery (arrow) and a 3.75x25 Silk Vista Baby flow diverting stent in internal carotid artery (double arrow).
 b. Digital subtraction angiography, same projection without magnification.

Newly developed flow-diverting stents can be deployed even in arteries with a diameter between 1.5 mm and 2 mm (Figure 1). The new generation of these stents is fully visible thanks to new technologies that have enabled the manufacturing of the micro wires these stents are made of. Figures 2 and 3 illustrate in the best possible way the tremendous progress that has taken place in the development of endovascular devices. A wide-necked middle cerebral

artery aneurysm was treated with coils and a flow-diverting stent in 2017. An ophthalmic artery aneurysm was treated with only a flow-diverting stent in 2021. Both stents were designed and produced by the same manufacturer. The image shown in the Figure 3 was taken using the High Definition function integrated into the Alphenix Biplane system. The first, strong impression is that the stent used in 2017 was not only partly visible but also primitive in comparison with the stent used in 2021. Even though the image is two-dimensional, it is not difficult to get a three-dimensional perception of a complex, tapered cylindrical structure made up of numerous densely braided micro wires and bent in several planes. The development of Canon's Alphenix Biplane system very successfully follows the development of neurovascular devices. Thanks to this development, the treatment of even the smallest vascular targets with the finest neurovascular devices has never been as safe and reliable as it is now.



Dr. Ljubisa Borota, Uppsala University, Sweden.

Instead of a conclusion...

The Alphenix Biplane is a unique system from several points of view. Elegantly designed arms combined with a flexible lateral isocenter offer almost unlimited adaptability to the shape and size of vascular targets. It is not an exaggeration to claim that impossible working projections do not exist with this machine. Multiple dose-saving functionalities contribute to the reduction of the dose to the patient and to the staff to the lowest possible values.



Figure 3:
The same case as on the Figure 2. Stents and coils are visualised by High Definition.

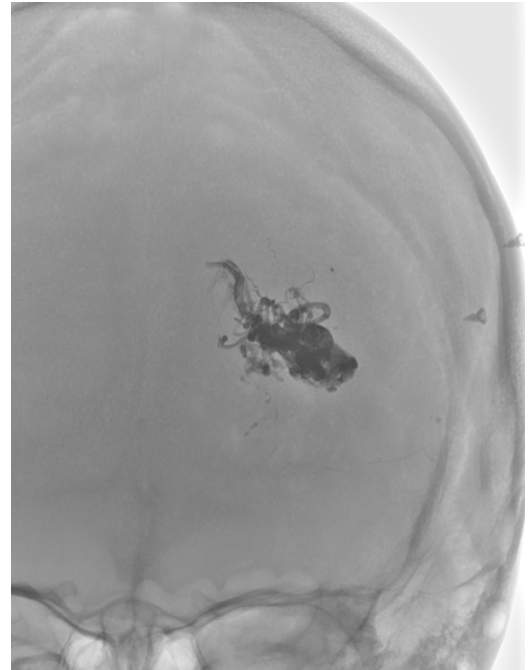


Figure 4:
Onyx cast in cerebral AVM ... or in art analogy: the take-off of a black swan.

Neurointervention is somewhere between fine art and medicine... Sometimes, closer to fine art... The aim of our interventions is to re-open or reconstruct pathways for the blood supplying the brain or to fill bizarre cavities, aneurysm, fistulas or AVMs, with some of the numerous embolic materials available. A neurointerventionalist is like a sculptor who creates bizarre casts in the brain vasculature that remind one of modern abstract sculptures (Figure 4).

The High Definition function offers not only excellent visualization of the smallest anatomical structures and the smallest devices and their ultrastructure, but also offers the operator a unique visual, artistic experience. This machine is really the point where cutting-edge technologies and fine art meet. //



Visit our website or scan the QR code:
<https://eu.medical.canon/products/angiography/alphenix/neurology>

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From left to right: Mr. Pascal Dacher (Health Manager), Ms. Emilie Montfort, Ms. Virginie Boulanger, Mr. Cyril Dadier (Radiographers), GIE IRM Medical Imaging Center Beauvais (Centre d'Imagerie Médicale du Beauvaisis), France.



The MR Theater Offers a Greater Sense of Escape and Improves Imaging Quality

Revolution, evasion, comfort: These words would best describe the MR Theater, Canon Medical's groundbreaking technology to ease MRI examinations, according to Pascal Dacher, Health Manager at the GIE IRM Medical Imaging Center Beauvais (Centre d'Imagerie Médicale du Beauvaisis), France, where the equipment has recently been installed.

The Medical Imaging Center in Beauvais, northern France, treats all MR requests for all types of clinical applications except cardiology. "We perform osteopathy, neurology, oncology, women's imaging, and pediatrics examinations," Mr. Dacher said.

A main challenge in clinical practice is to secure imaging diagnosis, particularly in anxious, claustrophobic and pediatric patients, who are traditionally more difficult to scan.

To tackle this issue, the team has recently installed two Canon Medical Vantage Orian large aperture MR systems, one of which is equipped with the MR Theater.

A new MR experience

It has been shown that performing examinations in relaxed, cooperative patients improves image quality and diagnosis. Feeling at ease helps patients lie still during the examination.



Control room of the Vantage Orian at GIE IRM Medical Imaging Center Beauvais (Centre d'Imagerie Médicale du Beauvaisis), France.

The MR Theater, which projects peaceful, virtual and immersive reality inside the bore, helps distract patients from the ongoing examination and reduce the stressful and claustrophobic effects of MR.

This is the reason that motivated Mr. Dacher and his team to purchase Canon Medical's technology. "Our ambition is to support all our patients as best as possible during imaging examinations, by offering them a new

MR experience. We want to take care of a maximum of claustrophobic patients and children. We believe that the MR Theater can be a relaxation and distraction device that will facilitate management of these patients," he said.

The GIE IRM Medical Imaging Center is used to taking bold steps to improve patient experience. The team notably installed France's first Titan system in March 2009 and was one of the first imaging centers to offer to any patient

the performance of comfortable MR examinations inside a wide-opening tunnel (71 cm).

"We have always paid attention to our patients' comfort. We aspire at setting ourselves apart from other imaging centers, by offering innovative and exclusive comfort technologies. Our best ambassadors are our patients. We are convinced that the MR Theater will help us further improve our patients' comfort," he said.

"We were stunned by the immediate impact on our patients, their enthusiasm and spontaneous acceptance. The immersive film helps to distract them."

Mr. Pascal Dacher, Health Manager at the GIE IRM Medical Imaging Center Beauvais (Centre d'Imagerie Médicale du Beauvaisis), France.





Canon Medical's Vantage Orian with MR Theater at GIE IRM Medical Imaging Center Beauvais (Centre d'Imagerie Médicale du Beauvaisis), France.

High acceptance and better results

The team performs any kind of clinical examination with the MR Theater for every patient, but gives priority to claustrophobic and pediatric patients.

Patient reception of the new MR Theater has been overwhelmingly positive, with patients feeling pleased, free and less lonely. Although Mr. Dachet and his

colleagues knew the technology would make a difference, they didn't expect such an instant response.

"We were stunned by the immediate impact on our patients, their enthusiasm and spontaneous acceptance. Our patients confirm they have had a more pleasant time and a greater sense of escape. They feel less lonely in the examination room. The film that is being projected in an immersive and realistic way helps distract them," he said.

Oncology patients undergo numerous MR scans as part of their treatment follow-up and have been particularly sensitive to this technology.

Caregivers have also welcomed the effect of reducing stress and claustrophobia on imaging quality. With the help of the MR Theater, clinicians can complete MR exams quickly and capture the high-quality images they need for accurate diagnosis and treatment.

"Patients are more relaxed, more receptive and more cooperative, which greatly facilitates the performance and quality of examinations. The MR Theater helps achieve patient cooperation and immobility, and thus secures image quality and avoids having to repeat sequences. The patient spends less time in the MR tunnel; the examination is generally faster and better," Mr. Dachet concluded. //



Left: Mr. Pascal Dachet, Health Manager at the GIE IRM Medical Imaging Center Beauvais (Centre d'Imagerie Médicale du Beauvaisis), France. Right: Patrice Coudray, Product Manager MR, Canon Medical Systems France.





Guiding the Needle to the Deepest Layers of the Body

Dr. Christian Schlegel, head physician of the sports medicine department at the Swiss Olympic Medical Center Bad Ragaz, uses the Aplio a450 for diagnosis and treatment of musculoskeletal (MSK) injuries. The system's unmatched image quality and beam function enable him to access the tiniest tendons and deeper layers of the muscles and will allow him to perform new types of interventions into the spinal facet joints, he told Visions.

A renowned sports medicine provider

The Swiss Olympic Medical Center Bad Ragaz in the canton of St. Gallen has been providing care to elite athletes for the past 16 years.

Located in a popular spa and health resort, the center is a renowned institution in sports medicine in Europe, caring for both Switzerland's and Liechtenstein's Olympic teams. But Dr. Schlegel and his team also increasingly treat non-professional athletes who want to resume sports practice after an injury.

"Two thirds of our activity involves patients who had surgery and want to return to their activity level before operation," he said.

A typical day at the center includes the examination and treatment of patients who present either with sports trauma or different MSK problems caused by diseases such as osteoporosis.

The center also carries out medical and sports checkups, laboratory testing, performance diagnostics and training advice.

Because patients are so eager to return to their activity level before trauma, managing their expectations is a major component of Dr. Schlegel's work and a precondition for him and his team to deliver the best possible care.

"Patients want to go back to sports practice as soon as possible. It can be challenging to help them train adequately and reduce their usual training for them to recover completely," he said.

To make sure patients do recover, all the specialists in the team – sports physicians, physiotherapists and scientists, psychologists and nutritionists – work closely together. They also cooperate with trainers and therapists who are involved in patient recovery outside the center.



To diagnose and treat MSK injuries, Dr. Schlegel uses a combination of tools, including imaging.

The comprehensive diagnostic work-up starts with taking the patient history followed by a thorough manual examination to locate the problem. Then he uses x-ray, CT, MRI and ultrasound to collect more information and confirm results.

X-ray and ultrasound are also central to guiding injections of hyaluronic acids, platelet-rich plasma or cortical steroids to the joints and tendons.

Dr. Schlegel uses ultrasound almost every day not only to improve precision during injections, but also to increase

patient comfort: "It's less painful for the patient because I can insert the needle precisely and directly in the right place.

To provide optimal treatment, Dr. Schlegel chose Canon's Aplio a450 a year ago.

Unveiling the smallest structures with high image quality

"The main reason I decided to buy the Aplio is the impressive image quality for MSK diagnosis," he explained. "The second reason is that the needle guide, which is called the BEAM function, enables me to easily see the needle with a special enhancement function. That's very helpful when I perform injections."

When he chose the system, Dr. Schlegel focused on how it enables to see the nerves and guide the needles, as these are the two most difficult tasks when performing an intervention.

"I need very high image quality to see the right structures and then, when I do an injection, I need these additional tools such as BEAM and needle enhancement," he said.

Since it was installed in December 2019, the Canon equipment has fully met and even exceeded the expectations. "I simply enjoy working with the Aplio a450," he said. "I like the great images and the easy-to-use reporting function. I get a really good and detailed report, which I can seamlessly introduce into



The Medical Health Center opened in 1957, the institute for sportsmedicine in 1998 and became an official Swiss Olympic Medical Center six years later. The center treats all elite athletes from juniors to regional and national levels, providing advice and support inter alia in the following areas: check-ups and performance diagnostics, optimization of physical and mental performance, injury prevention, management of strains, training and nutrition.



“The BEAM function enables me to easily see the needle with the special enhancement function. That’s very helpful to perform the injections.”

Dr. Christian Schlegel, head physician of the sports medicine department, Swiss Olympic Medical Center Bad Ragaz.

Biography

Dr. Christian Schlegel is head physician of the sports medicine department of the Swiss Olympic Medical Center Bad Ragaz in Switzerland. He specializes in physical medicine and rehabilitation, sports medicine, manual medicine, interventional pain management and musculoskeletal ultrasound. He was head physician of the Swiss Olympic Team in the Winter Olympic Games between 2006 and 2014. Dr. Schlegel worked as a medical doctor and sports instructor for alpinism and skiing at the Swiss Federal Institute of Technology in Zurich (ETH Zurich) for over 20 years.

my patient’s history. I can also use the report when I talk to other physicians and patients, it’s a good reference.”

The Aplio a450 is particularly well suited for specific and complex procedures, such as special injections to the nerves or deep structures.

The hip can be particularly challenging to access, especially in larger patients. “The deeper you are, the more difficult it is to get images. But with this system I made big progress. Compared to other machines, the Canon offers very good quality in the hip and deep layers,” he said.

Dr. Schlegel can perform more examinations with the Aplio a450, for example in the shoulder, the ankle, the Achilles’ tendon or the plantaris and patellar tendons.

He also uses the Aplio to guide a number of infiltrations and injections to treat tendinitis or peri-tendinitis for partial tears of the tendons in the ankle or the hip.

Some very small tendons and structures were nearly impossible to see

with previous equipment, Dr. Schlegel explained: “It was very difficult to find the infrapatellar branch of saphenous nerve with the machine we had before. But we did find it with the Aplio a450. It’s especially good to image this structure.”

The most spectacular case he treated with the Aplio a450 was a patient with chronic knee pain who underwent a block of the infrapatellar nerve. “The patient was pain-free for the first time in two years. By the second injection, the pain disappeared. It was very impressive what we could achieve with ultrasound control on the Aplio a450,” he said.

So far, Dr. Schlegel is the only specialist in his institution using the Aplio a450, but this might change soon as colleagues are starting to notice the system’s potential for their field as well.

“Some time ago, I had an emergency patient and needed to call Dr. Küpfer from our angiology department to examine the vessels,” Dr. Schlegel said. “He was so impressed by the quality of my machine that he now wants to get one as well.”

Future applications with the Aplio a450

Dr. Schlegel wants to focus more on treating tendons and back problems and is convinced that this will be possible thanks to the Aplio’s high imaging quality.

He wants to offer injections into the spinal facet joints, which he now performs under x-ray control. “My intention is to do these procedures with ultrasound to diminish radiation exposure. I’ve attended courses on the topic but haven’t tried yet,” he said.

Moreover, Dr. Schlegel was impressed by the complete absence of technical issues during and after the installation of the Aplio 450. “I’ve been working with the equipment for nearly a year and haven’t had any technical problems. That was quite surprising because usually, with such sophisticated equipment, you would have issues. The Aplio is very reliable.”

The learning curve with the Aplio was easy and fast, about two weeks, Dr. Schlegel concluded: “You can always improve some details. But for daily practice, it works.” //

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To facilitate your workflow even more and make it more efficient, we have bundled several of our best technologies into one solution, which is not only intelligent and intuitive but compact at the same time. This allows the solution to be used in almost any clinical setting.

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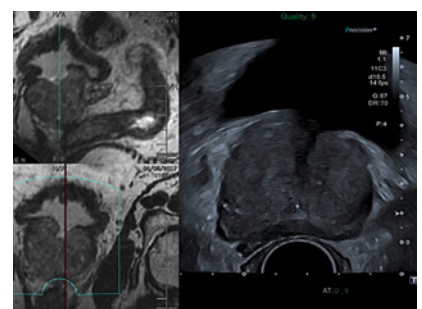
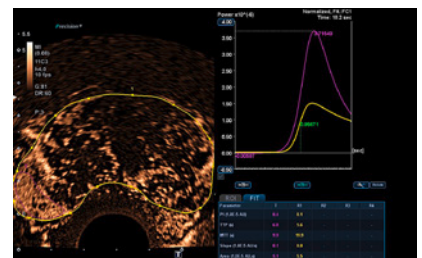
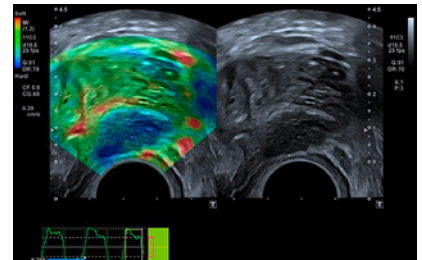
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VISIONS spoke with Dr. Andre Böhmer and Dr. Thorben Schulze.

Dr. Andre Böhmer is an equine veterinary specialist who has been working for the Telgte veterinary clinic since 2002.

Dr. Thorben Schulze is a dual equine and diagnostic imaging specialist who developed the Qalibra-CT, together with Vet-DICon GmbH.

CT for Horses – Image Quality and Safety are Crucial

A new Canon CT scanner was recently installed on a height-adjustable platform in the Telgte veterinary clinic in Germany, the 'Qalibra-CT'. The combination of a phenomenal CT and a unique lifting platform enables CT examinations to be performed on standing, non-anesthetized horses.

Dr. Böhmer from the Telgte veterinary clinic explains the advantages and opportunities made possible with this innovative design, developed by Dr. Schulze Vet-DICon, and installed in collaboration with Canon Medical.

What distinguishes the Telgte veterinary clinic?

Dr. Böhmer: The Telgte veterinary clinic is a national referral center that has existed for several decades. We specialize in the treatment of horses. Our customers are both national and international.

For which type of medical questions will you use your new CT?

Dr. Böhmer: Computed tomography is the preferred imaging modality for diseases in the area of the head and limbs,

especially in the joints. Examinations of the joints, particularly the hyaline cartilage, have so far been almost impossible with veterinary medical imaging modalities, such as MRI.

With this CT, we can perform examinations of the front and rear limbs, head and neck of the standing horse. In addition, under general anesthesia, we can visualize upper limbs, from the stifle to the hips, the thoracic spine, and occasionally even the sacral joint and the back.



The height adjustment in combination with the excellent image quality of the CT is the real differentiating feature of the Qalibra CT.

What exactly is the advantage if the horse is examined standing up in CT?

Dr. Böhmer: The greatest advantage is that we can now visualize structures that are normally difficult to access in high quality 3D. Orthopedic problems are one of the most common indications for equine CT examinations and being able to do these without general anesthesia is a great benefit. Standing examinations

reduce both the risk to the horse and the cost of the examination. In the past, we only had the opportunity to examine the standing horse using low-field MRI, in which, for example, changes in the lamina of the hoof or the articular cartilage can hardly be detected. The new CT opens up completely new possibilities for equine medicine, with more reliable diagnoses and correspondingly more targeted therapies.

Why did you choose a CT from Canon Medical?

Dr. Böhmer: There are three main reasons why we chose Canon Medical's Aquilion Large-Bore CT.

- Firstly it is known for its superior soft tissue imaging, which is particularly important for visualizing ligaments and tendons during orthopedic exams.
- Secondly, with a gantry opening of 90 cm, it has the world's largest field-of-view of up to 85 cm, so we can examine our rather large patients more easily.
- Finally, the high image resolution of the system, in all three dimensional planes, was a key feature for us. Even structures as small as 0.31 mm can be displayed. This is the only way we can reconstruct, and visualize the scanned body region without losing quality due to distortion.

“For the first time, we are now able to scan body regions like chest, knees and hips.”



Height-Adjustable, Sliding Gantry CT System. First installations in Belgium, Germany and Switzerland.
 Photo: Bosdreef Referral Hospital for Horses

“Examinations without general anesthesia save time and money.”

Dr. André Böhmer, Telgte veterinary clinic.



This special orientation of the images is particularly important in veterinary medicine, as we cannot persuade our patients to align themselves completely straight in the CT.

The new Qalibra-CT solution is height-adjustable. Why?

Dr. Böhmer: The height adjustment in combination with the excellent image quality of the CT is the real differentiating feature of this system. This allows

the horse to stand motionless on the solid surface during the examination, which ensures maximum safety.

We can examine many different anatomical regions regardless of the size of the patient, since the height of the CT can be adapted to the size of the horse, or the examination region. This feature enables us to have a unique range of applications. So far, very few centers worldwide have had these options.

Which aspects were particularly important in the development of a CT for horses?

Dr. Thorben Schulze, Qalibra: Our motivation was the need for a high-quality imaging system that would offer the horse and personnel the best possible safety. Since physically restraining a horse, known for its desire to escape, for example in an examination stand, always involves risks, it was essential to avoid this.



We wanted to find a new way for equine veterinarians to carry out examinations, safely and quickly, without compromising image quality. Until now, this has mostly been reserved for human medicine.

To this end, we have worked closely over the years with a diverse team including technicians from Canon Medical, mechanical engineers, radiation protection experts and innovative veterinarians.

After the first year of using the 'Qalibra-CT' equine clinics report a lot of new experience, especially with examinations of the thoracic spine, the fetlock and the stifle joints. We are looking forward to the first scientific publications resulting from this work.

The Qalibra System can be moved vertically and horizontally?

The CT system is connected to a micro-processor-controlled platform that

can be adjusted in height and moved horizontally for the scan. The horizontal movement of the gantry over the patient is directly controlled by the electronics of the CT. Only in this way is it possible to fully exploit the potential of the Canon CT without any restrictions or loss of quality. To keep the horse comfortable and still access the isocenter of the CT, we turned the CT gantry 180°, while retaining the functionality of the original patient couch.

“Examination in the same standing position as with the farrier.”

Dr. Thorben Schulze, Vet-DICon GmbH, Qalibra CT.



The height-adjustable patient couch works regardless of if the horse is standing or laying down, making it easier for the horse and veterinarian.

The result is that head/neck and even limb regions can now be examined more quickly by CT than previously possible with X-Ray. Even a complete examination of both stifle joints, which requires general anesthesia of the horse, often takes less than 10 minutes with this Canon Large Bore CT.

To what extent do you address the safety and escape options in your system?

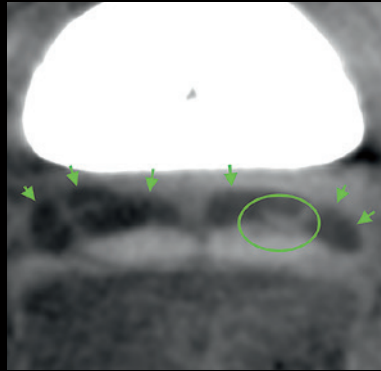
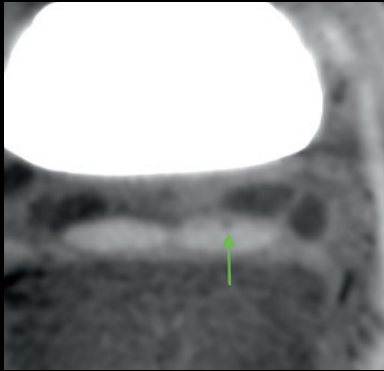
Dr. Thorben Schulze: Since the system was designed by veterinarians, this point was of particular importance.

We wanted to facilitate the CT examinations in such a way that the horse does not have to be in a restrictive examination stand. If a horse is in an unfamiliar environment, it must feel it can escape from a frightening situation in a fraction of a second. Therefore, our goal was to be able to position the horse freely in front of the CT and to keep the escape route open in all directions. When examining the limbs, the horse is in a position similar to that of the farrier. Due to the high speed of the CT, the examination only takes about 4-10 seconds. A special fixation is therefore not necessary. //

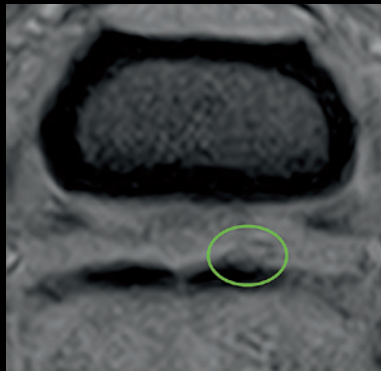
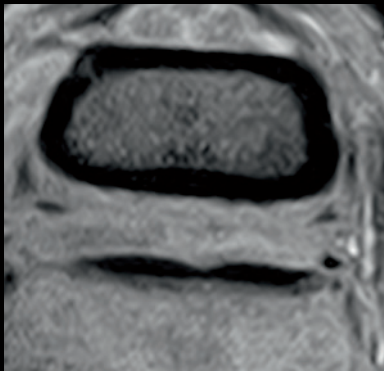


Clinical Cases

Case 1:



CT: small core lesion and hypertrophy deep digital flexor tendon (DDFT) (left arrow)
 CT: DDFT lesion with dorsal fibrillation and fibrin accumulation (circle) in the obviously distended navicular bursa (arrowheads)



Initial MRI examination: DDFT without abnormalities, but increased filling of the navicular bursa (left)
 MRI 4 weeks later: confirmation of the dorsal DDFT lesion with fibrillation and fibrin accumulation

History: The horse was presented with a mild lameness in the hoof region. The MRI examination did not provide a suitable explanation. The hoof region of the standing horse was examined in the CT without administration of contrast agent.

Finding: small, focal core lesion in the deep digital flexor tendon (DDFT) proximal to the navicular bone, with adjacent fibrillation of the tendon and fibrin accumulations in the navicular bursa.

Diagnosis: mild active tendonitis of the deep digital flexor tendon with secondary bursitis of the navicular bursa

Follow-up: Four weeks later, a second MR examination was performed for comparison. Since tendinitis is a progressively degenerative disease, the changes could then be confirmed here.

Conclusion: Between the individual 5 mm thick MR images, there is always a certain space that is not visualized. The initially very small lesion was not detectable during the initial examination. Since DDFT tendinitis is a progressive degenerative disease, it was only visible on MR four weeks later.

The CT produces much thinner, 0.5 mm, slice images that also overlap. This means that even the finest lesions in the bone and soft tissue are visible very early on.

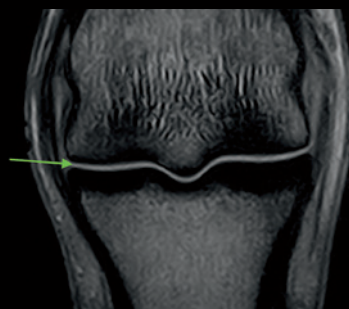
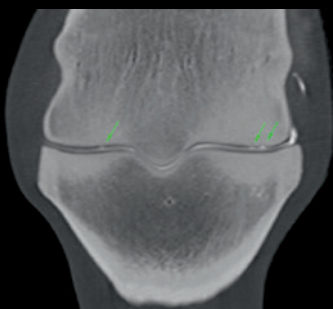


Case 2:



1. Sagittal CT slice of standing horse

The hyaline cartilage of both articular surfaces are visualized dark in the CT image (less X-ray absorption). If contrast medium is used (high X-ray absorption), the synovial fluid in between appears bright. The contrast agent is embedded in the cartilage lesions. In this case there are both partial thickness and full thickness-lesion.



2. Comparison of frontal CT (standing horse) and MRI (general anesthesia)

CT arthrography (left) of the non-weight-bearing limb enables separation of the articular surfaces and shows multiple cartilage lesions of varying depth. In the MRI, however, only a single high-signal line can be seen in the joint space. It represents a summation of the cartilage from both articular surfaces and the synovial fluid. Therefore, smaller cartilage lesions cannot usually be detected.

History: The horse showed chronic lameness that localized to the fetlock using diagnostic intra-articular anesthesia. The X-Rays were inconclusive and the MRI revealed only mild sclerosis distal in the metatarsal bone.

The fetlock joint of the standing horse was examined in the CT with intra-articular contrast agent administration (arthrography).

Findings:

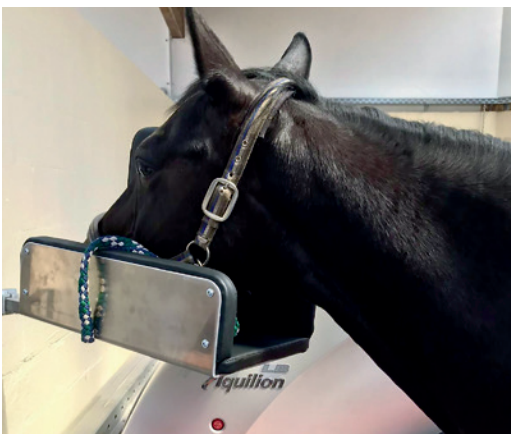
- Superficial wear-lines in the hyaline cartilage in the general direction of joint movement
- Fine cartilage tears extending down to the subchondral bone
- Subchondral sclerotic remodeling in the metatarsal bone and first phalanx

Diagnosis: mild osteoarthritis of the fetlock joint

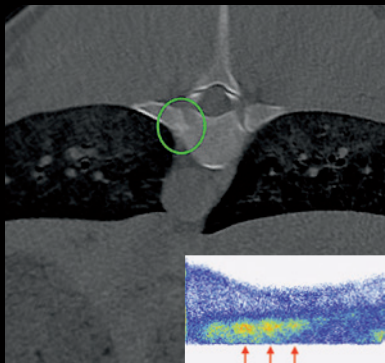
Progress: confirmation of the cartilage lesions by arthroscopy

Conclusion: CT arthrography is the most sensitive imaging method for examining articular cartilage. The non-weight bearing position of the examined leg of the standing horse is a prerequisite for being able to show both articular cartilage surfaces separately. In addition, sectional images in the sub-millimeter range are required in order to be able to reliably evaluate the thin (~1mm) cartilage.

With the help of CT, not only advanced cartilage loss but also partial thickness defects, in which less than 50% of the cartilage thickness is affected, can be detected as signs of an early stage of osteoarthritis.



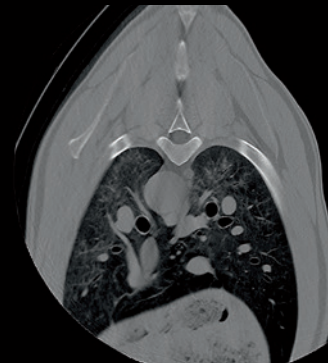
Case 3:



Osteoarthritis of a right costovertebral joint of the thoracic spine



Thoracic spine, withers, scapula



Thorax of a horse with lung window

History: The horse behaved increasingly unwillingly when riding and was sensitive to pressure in the region of the saddle. On scintigraphy there was increased uptake in the area of the vertebral bodies. A computed tomographic examination of the back was performed under general anesthesia.

Findings: Loss of the joint space between the rib and vertebral bodies on the right side at the level of the saddle region.

Conclusion: Due to a large gantry opening and powerful X-Ray generator, high-quality images even of large structures are possible. Examinations of the back and pelvic regions are possible in thoroughbreds or narrow horses with a thoracic diameter of up to 90 cm.

For the scan, the patient can be brought into the final examination position directly on the reconfigured CT couch using a hoist. Allowing the CT to scan directly the desired region.

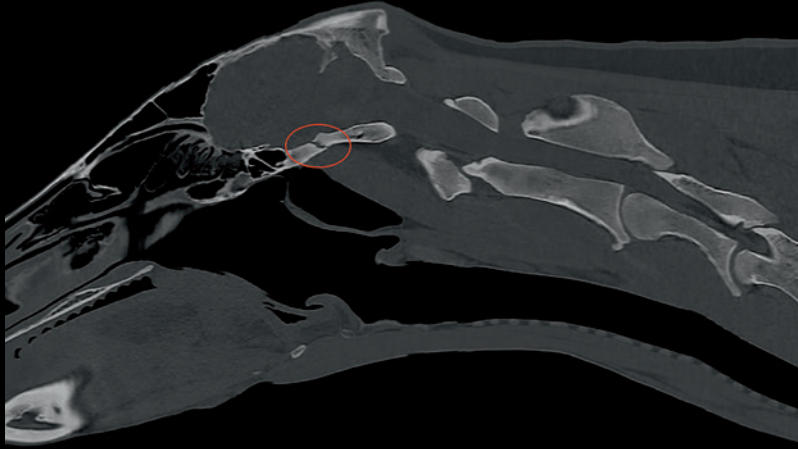
This keeps the time required for general anesthetic examinations very low.

As imaging this region is a new opportunity in equine medicine, we have much to learn about the frequency and clinical significance of many CT findings in these regions.



CT of both stifle joints simultaneously, while the front limbs remain fixed in the hoist.

Case 4:



Cervical spine CT, standing horse



Cervical spine CT, standing horse

Arrows:

- The CT can be moved outside the pit
- Indentation and stabilization of the front cover
- Isocenter height with focus on the caudal cervical spine

A mare presented with sudden onset of severe neurological deficits. The horse was experiencing uncontrollable, full body seizures resulting in recumbency. Radiographically, there were no changes to explain the problems. The severity and unpredictability of her condition made both tight restraint of the horse and general anesthesia particularly risky. A CT examination of the free-standing horse was carried out from the neck and skull region.

Findings: skull base fracture (complete fracture of the sphenoid bone with step and callus formation)

In order to enable examinations of the caudal neck region, various structural adjustments of the CT system were made in the development phase. These include, for example, that the travel path of the CT must extend beyond the pit limits at the front, that the isocenter can be aligned at the level of C7 and that the front cover of the gantry has been narrowed, allowing the horse to get closer to the isocenter.

Watch the videos:



'New Opportunities for Equine CT Under General Anesthesia'



'Standing CT for the Equine Head and Neck'



'Standing CT of the Equine Distal Limb'



From left to right:
Habiba Islam, Dr. Mark Kon, Fiona Leung
Bradford Royal Infirmary, UK.



VISIONS spoke to Dr. Mark Kon, Consultant Radiologist at the Bradford Royal Infirmary, UK, about the experiences with the Aquilion Prime SP.

Designed to Meet New Demands in CT Scanning

As the demand for CT scans continues to increase in health-care, especially during the COVID-19 pandemic, every element of the functionality and efficiency of CT systems is under scrutiny. VISIONS spoke to Dr. Mark Kon, Consultant Radiologist at the Bradford Royal Infirmary, UK, to find out how the performance of Canon Medical's Aquilion Prime SP is meeting the needs of the hospital.

The Bradford Royal Infirmary (BRI) is a large teaching hospital in Bradford, West Yorkshire. Operated by the Bradford Teaching Hospitals NHS Foundation Trust, the hospital is affiliated with the Leeds School of Medicine (Leeds University). The Radiology Department at the BRI installed a Canon Medical Aquilion Prime SP CT scanner in 2020. While Dr. Mark Kon has used Canon Medical equipment for a long time, he explains how the Aquilion Prime SP in particular excels in meeting the increased demand for CT scanning in the department.

Optimizing workflow

There is a great deal of focus on workflow in CT scanning as demands increase. Features that enable the CT scanner to be as intuitive as possible, such as patient auto positioning and the Tech Assist Lateral Slide of the Aquilion Prime SP, can improve workflow significantly.

"Most of the time of a CT appointment is taken up by moving the patient rather than scanning," said Dr. Kon. "For this reason, facilities like low table height for mobile patients and the ability to correct table position remotely



Dr. Mark Kon.

to speed up the process of accurate CT scanning. Also, displaying the patient's demographics on the scanner gantry monitor ensures rapid and assured checking of patient details."

Enhanced image quality

With many years of experience in using Canon Medical systems, Dr. Kon has seen image quality improve over the iterations of scanners that he has worked with.

"In uroradiology in particular, patients with stone diseases often have recurrences, so comparison with previous imaging is essential. From this, you can really notice the increase in Signal-to-Noise Ratio (SNR) with successive technology. The jump to Advanced intelligent Clear-IQ Engine (AiCE) with the Aquilion Prime SP has brought a massive rise in this, in particular," he remarked. "Objectively, we have measured Standard Deviation (SD

as a representation of objective noise in images, before and after the introduction of AiCE, and can confirm that noise has been reduced from SD 15 to SD 10 in the bladder in CTs of kidneys, ureter and bladder (KUBs)."

A whole new approach

AiCE Deep Learning Reconstruction (DLR) offers a whole new approach in CT reconstruction technology that brings significant benefits in speed of image reconstruction, data and time savings, and increased accuracy.

"Image quality using AiCE is so obviously improved that we have had no issues at all implementing it in all our protocols," said Dr. Kon. "Images are available within only a few minutes, so we are able to report all in-patient scans during the same session. The only exception is trauma scans, in which we try to give a preliminary report from the scanning console while the patient is

still on the table. Otherwise, all scans are processed with AiCE, including cardiac CT scans."

"The noise reduction achieved with DLR changed our requirements of image data storage, saving space in the hospital's PACS system," he remarked.

"Our practice is to send 1mm axial images to our PACS system. Previously, we required our radiologists to read 3mm images to reduce noise. Noise in 1mm images from AiCE is so low that we now view these images directly at 1mm," he added. "We can also reformat sagittal and coronal images from the same dataset. For non-specialist lung imaging, we will not have to make complete lung reconstructions, saving even more space in the PACS system."

And the team can work with added accuracy due to the quality of imaging and reconstruction with the Aquilion Prime SP and AiCE.



“The ease of in-room scanning ensures that you are exactly where you want to be and increase your yield.”

Dr. Mark Kon.

Streamlining Interventional Radiology procedures

The features of a new CT Fluoroscopy panel for the Aquilion Prime SP, enable Dr. Kon and his team to focus on the clinical aspects of their Interventional work even more.

“For a lung biopsy, I would usually stay in the room with the patient, as I believe it is important to minimize the time with the needle in the lung and to be near the patient in the event of complications, such as pneumothorax or hemoptysis. With the new Fluoroscopy panel, we have a combination of fea-

tures that give us the ability go to target with one select button and one drive button. This process is precise and correct first time, every time. We can bring the patient out to manipulate the biopsy just as fast,” explained Dr. Kon. “In a teaching hospital situation, our trainees with less experience of table control find this functionality most useful, as they are able to concentrate on the clinical aspects of the biopsy rather than the mechanical table movement.”

High image quality supports high quality and better efficiency in Interventional work. “When a needle

is close to an important structure, high quality and ease of imaging is essential, so that you are not tempted to cut corners and assume it is ‘good enough,’” remarked Dr. Kon. “The ease of in-room scanning ensures that you are exactly where you want to be and increase your yield.”

The design of the new panel enables it to integrate within the scan room and enhances ergonomics.

“Dragging cables on the floor is no longer a limitation as the unit attaches directly to the table and it simply sits on the shelf when not in use. The touch screen works well with its sterile cover” he added. “Faster, more precise procedures mean that biopsies are more comfortable for the patient, with greater confidence in a smooth procedure and more likely to achieve a diagnostic result.”

Meeting increased demands

Today’s busy clinical environment is only set to continue with increasing demand on CT capabilities and capacities, and requires a reliable scanner that helps significantly in optimizing workflow.

“The Aquilion Prime SP is a robust CT scanner for any radiology department performing large numbers of routine scans daily,” concluded Dr. Kon. //



Bradford Royal Infirmary, UK.

New Vantage Elan / NX Edition

Canon Medical has successfully launched its latest 1.5T MR - the Vantage Elan / NX Edition. The new system completes Canon Medical's intelligent and productive MR Portfolio. Two diagnostic imaging facilities in Europe, one in Germany and another in Italy, are the first to benefit from its advanced technology.

Advanced functionality

The new functionalities of the Vantage Elan / NX Edition are designed around customer and patient benefits. Meeting demand for high-resolution images with no compromise

“The implementation of AiCE has significantly accelerated our Canon Vantage Elan. The number of patients examined per day has increased, while the image quality remains good with a reduced scan time.”

Prof. Reinhard Tomczak, Head of Center, Zentrum für Radiologie Bad Friedrichshall (Bad Friedrichshall Radiology Center), Germany.

and faster scan time remains the top priority for all radiologists. With Advanced intelligent Clear-IQ Engine (AiCE) and Compressed SPEEDER, the Vantage Elan / NX Edition can provide this. AiCE can be used in 96%* of the system's MRI applications. It reduces scan times and simultaneously improves image quality. Fast 3D - a technique to accelerate 3D studies by up to 50% has been extended to cover 'Time of Flight' studies, and is also available with the Vantage Elan / NX Edition.

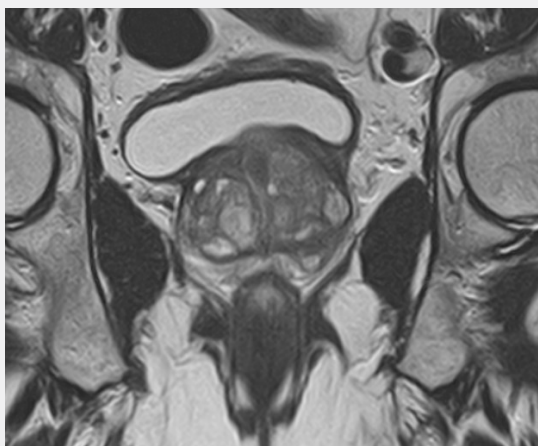
Ease-of-use and streamlined workflow are also always fundamental requirements for MR users. The Vantage Elan / NX Edition features software that provides new technological possibilities through multiple functionalities, such as ForeSee View, KneeLine+, SpineLine+ and more. These advanced techniques ensure reproducible image quality, automate the planning process, and avoid the need to re-plan and re-scan in challenging studies, including cardiac- and ankle-imaging.

Superior results

The Center for Radiology and Nuclear Medicine, in Bad Friedrichshall, Germany is a multi-center radiology clinic

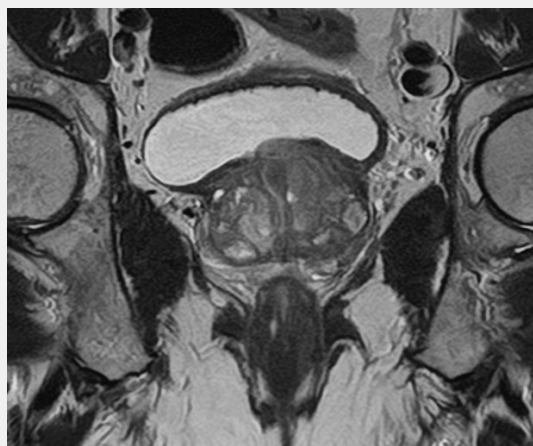
* Based on the IMV report on total MR Procedure Volume in 2019

Prostate Coronal T2



Original

Resolution: 0.9 x 0.9 x 3 mm | Scan Time: 6'20"



AiCE - Higher resolution & faster Scan time

Resolution: 0.7 x 0.7 x 3 mm | Scan Time: 3'43"

Courtesy: Studio Radiologico Bernasconi (Bernasconi Radiology Clinic), Seregno, Italy.

“With AiCE we can reduce the scan time while keeping high standards in terms of image quality, and improving patient compliance.”

Dr. Paolo Bernasconi, Radiologist, Studio Radiologico Bernasconi (Bernasconi Radiology Clinic), Seregno, Italy.

headed by Professor Reinhard Tomczak with a team of more than ten radiologists. The center has acquired a Vantage Elan / NX Edition to achieve precise and quick MR imaging for a wide spectrum of applications, including Cardiac MR.

The Studio Radiologico Bernasconi is a well-known diagnostic imaging center in Seregno, Italy. The center receives patients with various conditions and imaging needs from the public national healthcare system of the Lombardy region. The center is headed by Dr. Paolo Bernasconi and has a team that includes six multi-specialized radiologists. The center is already renowned for its excellence. Outstanding image quality is essential in meeting its objective to achieve the highest diagnostic confidence possible. With the Vantage Elan / NX Edition, the center has been able to improve image resolution across different anatomies, including brain, liver, shoulder and knee, with significant and measurable improvement in Signal to Noise Ratio (SNR). In addition, the scan time for some challenging applications, like prostate MR, has been reduced by 36%.

Intelligent MR: Fast, Efficient and Compact

Fast, efficient and compact, the Vantage Elan / NX Edition is a next generation MRI that offers a broad spectrum of benefits. //

“With AiCE we have better tissue contrast and it is easier to identify the margins of the lesions.”

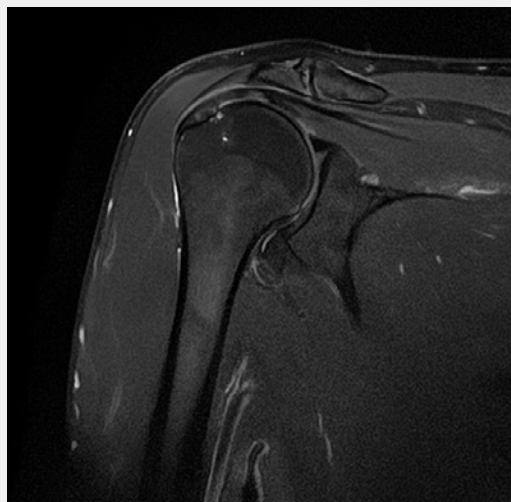
Dr. Francesca Invernizzi, Radiologist, Studio Radiologico Bernasconi (Bernasconi Radiology Clinic), Seregno, Italy.



Find out more on our website:
https://eu.medical.canon/products/magnetic-resonance/Vantage_Elan



Ankle sagittal T2 (0.2 x 0.2 x 3 mm).



Shoulder coronal T2 FS (0.3 x 0.3 x 3 mm).



Brain coronal T2 (0.3 x 0.3 x 4 mm).

Courtesy: Studio Radiologico Bernasconi (Bernasconi Radiology Clinic), Seregno, Italy.

‘Moving Together’ - The European Musculoskeletal Institute

The Instituto Musculo-esquelético Europeo (IMSKE; European Musculoskeletal Institute) is a new specialist hospital in Valencia, Spain. Opened in 2020, the pioneering facility is unique. It offers a wide spectrum of expertise in trauma care, including rheumatology, sport medicine, rehabilitation, physiotherapy within the context of plastic surgery, pediatric orthopedics, chiropody, nutrition, psychology, dermatology and neurology. The IMSKE has a multidisciplinary team of 70 musculoskeletal specialists and is fully equipped with Canon Medical imaging equipment. VISIONS explores how the institute is set to become the best traumatology hospital in Spain.

Integrated musculoskeletal care

The IMSKE was created by brother and sister, Dr. Ignacio and Dr. Isabel Muñoz Criado, who recognized the need for better facilities for dedicated musculoskeletal care almost a decade ago. Now Medical Director of the IMSKE, Dr. Ignacio Muñoz Criado is renowned as one of the best orthopedic surgeons and traumatologists in Spain. He has established a solid reputation in private hospital environments and in treating tennis professionals. His sister, Dr. Isabel Muñoz Criado, a graduate of Medicine and Pharmacy from Valencia University, in Spain, was also Manager of the Higher Public Health Research Center (CSISP) and the Príncipe Felipe

Research Center, both in Valencia, Spain, before becoming Managing Director of the IMKSE.

“Our aim is to give integrated care with regard to musculoskeletal pathology, so that the patient can continue his or her rehabilitation with good results. Therefore, the patient who visits an orthopedist with an unknown condition can be sent to the right specialist immediately with proper diagnosis, even if that is in another discipline, and we can start resolving the problem on the same day. We want this to also include patient care with regard to prevention,” Dr. Isabel Muñoz Criado explained.

“Our vision is to ensure that patients and their relatives, have an exceptional experience; and this also extends to the professionals such as doctors and nursing staff. We want them to feel comfortable in their workplace. I’m very happy because we are creating a fantastic team. We have contracted people directly at a time that is very complicated, as currently there are a lack of doctors and nurses on a national level. It’s a shared culture and everybody who joins us, makes it his or her own. It’s transferred to everyone who joins the team. This is invariably transferred to patients. They are treated so well that they leave happy.”



Expertly equipped

The IMSKE Team chose Canon Medical to equip the state-of-the-art facility and have installed Canon Medical’s Vantage Galan 3T, Aquilion Lightning, Aceso, Aplio i800, Ziehm C-arm and Vitrea post-processing.

“Canon Medical’s Project Manager, Roberto Sanz, made it all easy as from the first moment. Everything ran very smoothly with the service engineers responsible for the installation and the application experts, who provided the training. I’m very happy with the entire team,” remarked Dr. Isabel Muñoz Criado.



Dr. Isabel Muñoz Criado, Managing Director of the IMKSE.

Dr. Eva Llopis is Head of the Imaging Department at the IMSKE. She is also the Vice President of the SSR (Society of Skeletal Radiology), was the President of the Spanish Musculoskeletal Radiology Society (Sociedad Española de Radiología Musculo-Esquelética, SERME), and is on the Board of the International Skeletal Society (ISS).

“One benefit of being in contact with various international societies is that you can engage with other colleagues and get to know the issues that they have and how they have resolved them. This has allowed me to become familiar with the experiences of many of them,” she explained. “What I liked best was that I found out that Canon Medical has the capacity to collaborate on a project from the initial phase, right through to the development and implementation of the systems.”

“They told me that Canon Medical are trustworthy. This gives you much peace of mind when you are about to purchase all the medical diagnostics equipment for a hospital. This is the

reason why we decided that all equipment should be of the same brand and why we wanted Canon Medical to be the supplier,” she added. “Now I can state that they support you through the entire journey from project start to finish by advising and assisting during all project phases. I can also confirm the overall willingness of Canon Medical not only to assist, but to listen to our proposals and implement them and always with positive feedback.”

Best diagnoses

The IMSKE needed to select machines that could guarantee the best diagnosis in conventional radiology, ultrasound and 3 Tesla MRI. Their criteria included best image quality, fastest speed, reliability and accessibility.

The Aplio i800 ultrasound machine is used to examine small articulations and soft and superficial parts.

“We can say that we have the best ultrasound system on the market, the Aplio i800,” remarked Dr. Llopis. “The hockey stick is incredible when it comes to examining hands and feet.

We also find the transducer (probe) for soft parts amazing: it provides excellent resolution.”

“There are more and more percutaneous procedures that are minimally invasive through ultrasound technology and, in this sense, the Aplio i800 is Canon Medical’s ‘big gun’, since it gives us an incredible quality and helps with regard to surgery and diagnostics,” said Dr. Ignacio Muñoz Criado. “I would like there to be an Aplio i800 in every consultation room. Today, this is not possible, but a day will come when every doctor will have one and will diagnose and treat in real time.”

The IMKSE’s Vantage Galan 3T MR is key for articular pathology.

“The difference between the Canon Medical Vantage Galan 3T and other MRI machines on the market is that we can differentiate very small structures in the joints, which allows us to provide treatment during initial phases of injury. If lesions are bigger, they are more complicated to treat,

and require a more difficult, more expensive and longer treatment for the patient to recover,” said Dr. Llopis. “We are happy with the system: the short tunnel and the 71 cm opening of the gantry significantly reduces the feeling of claustrophobia for the patient. The location of the hospital allows us to have natural light in the MRI room, which also helps reduce patient anxiety. All of this contributes to increased patient comfort.”

“The Vantage Galan 3T MRI provides an image quality that is impressive.”

“The Vantage Galan 3T MRI provides an image quality that is impressive,” added Dr. Ignacio Muñoz Criado. “When compared to others, you notice the difference. This is very important for us, because we often work with top athletes and, with this system, nothing goes unnoticed. This is key since when we see the cartilage lesions, we can carry out diagnostics and start a specific treatment for each player.”

The combination of Artificial intelligence (AI) and MRI enables the IMSKE to focus examination and treatment on a more personal level for each patient and to improve protocols. The scan times are shortened and the movement artefacts are minimized, so the need to repeat examinations can be avoided. All of the above ensures that the patient needs to spend less time in the machine.

Although the Ziehm C-arm has not been used much until now we expect it to have a strong role as substitute for fluoroscopy for articular punctures.

The Aceso X-Ray room is a manually operated system which is ideal for our MSK radiography. The system provides advanced automated tracking for the table and chest stand making it also the ideal system for Image Stitching examinations. Canon’s ultralight, high sensitivity detectors ensuring that the Aceso offers a superb all-round digital X-ray system for all our MSK imaging.

Dr. Llopis is very familiar with Canon Medical CT scanners. “As the Aquilion Lightning CT has the possibility to perform fluoroscopy, we also perform punctures although only a few have been carried out to now. We have already started to make pericyte infiltrations for extraforaminal sciatica in relation to deep gluteal syndromes,” she said.

“With regards to CT: When you have a CT with high quality capabilities you can see that it has an incredible use,” added Dr. Ignacio Muñoz Criado. “For example, today, a top basketball player came for a consultation.



Dr. Eva Llopis, Head of the Imaging Department at the IMSKE.



Dr. Ignacio Muñoz Criado, Medical Director of the IMSKE, orthopedic surgeon and traumatologist.

X-ray showed that it could be a banal fracture; however, after performing a CT-scan we found out it was a spiral fracture of the finger. This is much more complex than what the general x-ray had shown. The CT images are very important for us because a 3D image helps the patients to understand their condition better. Patients leave with a lot more information and confidence about our diagnosis and treatment. This is why I have a display monitor to show the images to the patients and explain everything. The patient is the center of our universe. Moreover, high quality equipment for visualizing the images is also very important for our staff in their day-to-day work and helps them to provide high quality service to the patients.

Pioneering developments

One area of interest of the IMSKE for MR developments is the Dixon technique. Dixon imaging allows us to obtain different types of image contrasts with a single acquisition. They are interested in looking at approaches that have less artefacts than Spin-Echo-based Dixon sequences.

“Since installation was only performed quite recently, we are still adapting to the new situation, but I’m sure that there are sequences that can be improved, and we have every confidence in Canon Medical when it comes to helping us to achieve

this,” said Dr. Llopis. “We have a very good relationship with the application specialist and together we are working on the improvement of some specific techniques. We are very interested in improving the Dixon sequences.”

New protocols

With its advanced new equipment and the support of Canon Medical, the IMSKE is able to develop some new protocols in its specialist work.

“We need to examine lower limbs faster. Many examinations are performed here of sports teams and especially related to basketball. Basketball players are tall people and the most frequent muscular pathology is related to hamstrings, which are very difficult to examine using ultrasound when various muscle groups are affected. This is why you often need MRI. This is the modality that we are developing techniques in how to examine hamstrings as a whole. This type of examination in a normal person is done in a single sequence, but, for a basketball player, we need several. We are, therefore, developing a specific and faster protocol,” explained Dr. Llopis.

“We are also very interested in cartilage sequencing. We want to find out the essential condition in sports people, and not just because growth factor or stem cell techniques will be developed, but

“We can say that we have the best ultrasound system on the market, the Aplio i800.”

because we need imaging techniques to assess pre- and post-treatment and give validity to a surgical or medical technique. I’m very familiar with Vitrea, I believe it’s the best reconstruction console and I’ve got high expectations for dynamic examinations and cartilage segmentation sequencing,” she added.

Moving forward on a daily basis

With the motto: ‘Moving together’ (‘Nos movemos contigo’ in Spanish). The IMSKE recognizes that it can only progress if the patient progresses. “Only if our patient moves forward will we move forward. Only if our patient improves will we improve,” they say. With the support of Canon Medical, they are also moving together on a daily basis. //



Prof. Kypros Nicolaidis, Kings College Hospital, London, UK.

*VISIONS spoke with
Prof. Kypros Nicolaides
about using Canon's
Aplio i-series systems
in fetal medicine.*

Revolutionizing Fetal Medicine for Decades

The Fetal Medicine Foundation, based in London, United Kingdom has made a significant contribution to advancing fetal medicine globally for more than 20 years. Established by Prof. Kyprianos 'Kypros' Nicolaides, it aims to improve the health of pregnant women and their babies through research and training in fetal medicine. Ultrasound scanning is, of course, absolutely fundamental in its work, and for many years, the Foundation has leveraged Canon Medical's latest technology to advance science in this field.

Prof. Nicolaides is one of the world's most well-known pioneers in fetal medicine. He has a real passion for fetal ultrasound.

How it all started

"As a medical student in 1978 at Kings College Hospital in London, I got to watch the moving image of a fetus within the uterus for the first time, and it just fascinated me. I fell in love with this. A thousand questions were raised in my mind; What does the fetus feel?

How does the fetus think? How does it interact with the mother? How does it grow? How does it respond? And importantly, what happens if there are any problems with the pregnancy?" he explained. "So, I found my mission! After I qualified in medicine, my whole life was completely preoccupied with fetal medicine. I studied Obstetrics and Gynecology, because there was no other route into this area of medicine at the time, but my obsession, my love, was for fetal medicine."

“When I started in clinical practice, everything we were seeing was completely new,” he remarked. “Now, we have moved on from an era, in which you could see hardly anything, to being able to see fetal anatomy in

very great detail. This then expanded from an era of trying to diagnose fetal abnormalities, to assessing pregnancy and predicting and preventing many of the main pregnancy complications.”

1980s Shift to visual diagnosis

The 1980s, developments in ultrasound enabled a whole new era in fetal medicine to unfold.

“We were describing how the fetus grows, producing normal ranges of various parameters, and we studied fetal physiology,” remarked Prof. Nicolaides. “It was a very exciting time when we were assessing and investigating fetal physiology. The equipment we were using was becoming better and better, and our way of thinking was advancing too. We were diagnosing fetal growth problems, and then increasingly, diagnosing fetal abnormalities. We also discovered how babies with Spina Bifida presented with changes in the shape of the head and cerebellum. Allowing us to challenge the traditional method of screening for this condition, with a better alternative – by looking at the shape of the head of the fetus.”

In the early 1980s there was still a lot of Rhesus disease, in which the mother’s blood proves negative, the babies blood group can be positive and the babies become anemic.

“Blood sampling was done by fetoscopy, but by the mid- 1980s we were able to do ultrasound-guided puncture of the umbilical artery to directly sample fetal blood and determine fetal hemoglobin,” he continued. “With the newly introduced Doppler ultrasound, we were able to discern a direct correlation between Doppler indices and fetal blood hemoglobin and I wrote important papers on this hot topic by then.”

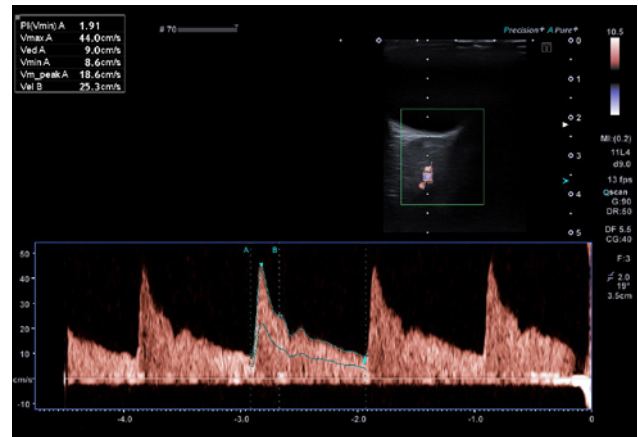
“There was a gradual shift away from indirect measures of fetal anomalies into direct visualization of fetal anomalies,” he added. “We also began with fetal therapy techniques. For example, We developed a method in which you could safely put a tube into the fetal chest, to drain the fluid from the



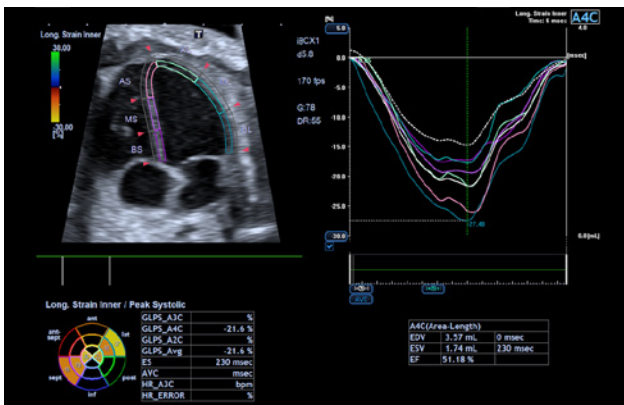
Prof. Kypros Nicolaides, Kings College Hospital, London, UK.



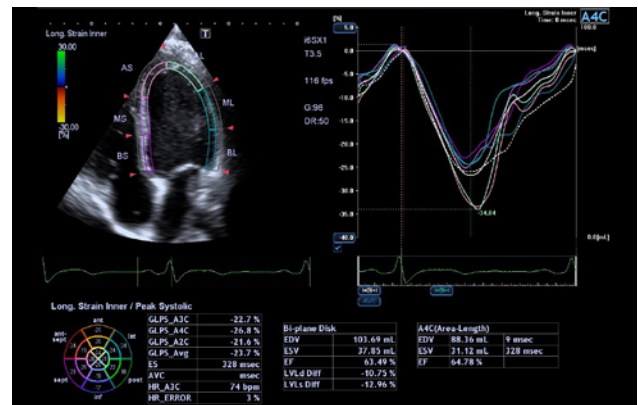
Nuchal Translucency Fetus 12 weeks.



Maternal ophthalmic artery Doppler.



Fetal speckle tracking showing inner longitudinal strain of left ventricle.



Maternal speckle tracking showing inner longitudinal strain of left ventricle.

thoracic cavity into the amniotic cavity, and the same in the cases of obstructive uropathy to decompress the bladder.”

1990s Significant discoveries

Prof. Nicolaides acknowledges several life-changing events from the 1990s that have also steered a new course for fetal medicine. In 1992, he discovered that fluid behind the neck in the twelfth week of the pregnancy could signal several defects, including Down Syndrome. This led to the introduction of the nuchal translucency scan. Also in 1992, together with Prof. Yves Ville, he discovered a therapy for Twin-to-Twin Transfusion Syndrome (TTTS) with an endoscopic laser.

Fetal medicine in the 1990s was then devoted towards a shift in ultrasound from the second to the first trimester,

improvement in imaging, improvement in training, and certification of competence.

“We established a method of training, certification and international audit in the new techniques that we were developing, because we recognized the benefit of them. However, things were moving so fast with diagnoses of fetal abnormalities, fetal pregnancy complications and then methods of improvement and interventions, that actually, it was almost beyond the scope of the regular funding bodies at that time,” said Prof. Nicolaides. “I felt that I had to find alternative sources of income. Therefore, in 1995, I created first a charity– The Fetal Medicine Foundation⁴ - and then a source of income for this charity through a private clinic – The Fetal Medicine Centre - both of which are in London.”

2000s Expanding upon new techniques

“Over the years, we gradually started describing that increased nuchal translucency is associated not only with Down’s Syndrome, but also other genetic syndromes and many defects, such as cardiac defects,” he said. “Then, we combined nuchal translucency with biochemistry. That remained the dominant method of screening for chromosomal abnormalities up until the mid-2010s, when cell-free DNA testing advanced.”

In 2000-2002, Prof. Nicolaides with Prof. Jan Deprest and Prof. Eduard Gratacos expanded the endoscopic technique used in TTTS to place a balloon in the fetal trachea to reduce the risk of pulmonary hypoplasia in diaphragmatic hernia.

2010s

Large scale studies and algorithms

For Prof. Nicolaides, the 2010s were about improving methodology and beginning long-term studies. From an era of trying to diagnose fetal abnormalities, there was an expansion into the assessment of pregnancy and prediction and prevention of the main pregnancy complications that could otherwise lead to death and handicaps.

“For example, measuring the cervical length as a method of predicting preterm birth, we showed that if we measure the cervical length and find the cervix to be short. If we give these women progesterone, we can substantially reduce the risk of preterm birth,” the Prof. explained. “Another example is measuring the uterine artery Doppler as a method of predicting fetal growth restriction, pre-eclampsia and still birth. Our results showed that we

could dramatically reduce the rate of severe early and preterm pre-eclampsia in the high-risk group by treatment with aspirin in first trimester.”

2020s

Leading fetal medicine

Today, the Fetal Medicine Centre is a major global institute in fetal medicine with around 20,000 patients per year.

“We have invested around £45 million in this to date and awarded around 700 scholarships to people. They come from all over the world to train for a two-year program, and many of them become leading Professors in their own countries. We have also invested hundreds of thousands of pounds in major screening studies and prevention studies for preeclampsia and preterm birth, as well as a building, which is now part of the UK National Health System (NHS). Women can

have their pregnancy care there free,” said the Prof. “The Fetal Medicine Foundation³ provides the highest standards of clinical care to pregnant women through the NHS.”

Despite the COVID-19 pandemic, the work of the Fetal Medicine Foundation³ continues to expand.

“At the beginning of the pandemic, I decided to host Zoom meetings with people from our field presenting their research, their findings, their knowledge in one hour webinars, which are held on Sunday afternoons. It started with 1,000 participants, and then very quickly there were 15,000+ people registering every time. It has created a new era on education beyond the traditional concept of having a congress,” explained Prof. Nicolaides. “The attendance shows a great interest in our field and a great deal of respect for the Fetal Medicine Foundation.⁴”



“I am very proud that we have extremely high quality systems from Canon that allow us to carry out our research. All our team are very happy with the excellent images, ease of use.”

Prof. Kypros Nicolaides, Kings College Hospital, London, UK.

Biography

Prof. Kypros Nicolaides is one of the world's most well-known pioneers in fetal medicine. He studied Biochemistry, Physiology, and Medicine at King's College London in the UK. He is specialized in Obstetrics & Gynecology since 1984 and is the Director of the Harris Birthright Research Centre for Fetal Medicine at King's College Hospital, London. Since 1992 he became Professor of Fetal Medicine at the King's College in London, UK and three years later Founder and Chair of the Fetal Medicine Foundation³. Prof. Nicolaides organizes the annual World Congress in Fetal Medicine and has been recognized through 15 honorary doctorates and is the recipient of many highly prestigious awards.

Future perspectives

Prof. Nicolaides finds the future difficult to predict. “Things are moving so extremely quickly really,” he said. “Everybody is talking about Artificial Intelligence (AI), and how this could potentially replace the need for sonographers. It is inevitable that this will happen to a certain extent. Of course, we will not do away with the humans. They will still be there to be interpreting the findings, but I think that AI will revolutionize many things. Imaging modalities will continue to improve with AI. That has already happened.”

Equipped for advanced research

Prof. Nicolaides and Canon Medical relationship started back in the early 90s with the Canon ultrasound system SSA-250A and is re-established with the Aplio i-series on a new high level research cooperation.

“We originally approached Canon, because we knew that they had the best system,” remarked the Prof. “We had been interested in undertaking maternal cardiac assessment in pregnancy for more than 10 years prior to this. Originally, this was being researched by indirect methods of assessing cardiac output and peripheral resistance, but we wanted to undertake major studies on maternal and fetal cardiac function and adaptation in different pregnancy complications through more direct methods. I heard that Canon had excellent equipment to achieve both those objectives. We developed a collaboration and have now a well-established relationship.”



Prof. Kypros Nicolaides, Kings College Hospital, London, UK.

“We have been supported by Canon in our research for many years, and have carried out many thousands of investigations using the Aplio i-series.” he added.

“More recently we have been studying the maternal ophthalmic artery Doppler. We obtained wonderful results to have an additional marker in the prediction of pre-eclampsia both in the second- and third trimester. This article was published in the January 2021 issue of the White Journal¹. We also carry out studies on this topic in the first trimester now.”

High quality research

Advanced ultrasound capabilities, such as Canon Medical’s Superb Microvascular

Imaging (SMI), Myocardial Performance Index² (MPI) and Speckle Tracking Echocardiography² (STE) have enabled research that has led to a better understanding of fetal and maternal physiology, pathophysiology of many conditions and has provided focus for further studies.

“I am very proud that we have extremely high quality systems from Canon Medical that allow us to carry out our research,” concluded Prof. Nicolaides. “All our team are very happy with the excellent images, ease of use. With the data and information acquired, we can study measurable parameters that can be correlated to find new links in fetal medicine.” //

References:

1



‘Ophthalmic artery Doppler in combination with other biomarkers in prediction of pre-eclampsia at 19–23 weeks’ gestation.

2



‘Influence of birth weight on fetal cardiac indices at 35–37 weeks’ gestation’.



‘Fetal cardiac function at 35–37 weeks’ gestation in pregnancies that subsequently develop pre-eclampsia.

3

‘For more information on the Fetal Medicine Foundation visit: <https://fetalmedicine.org>.

Providing Eye Care in the Heart of Africa

Second hand equipment can find a new life to improve healthcare all over the world and Canon Medical Systems Europe has many activities in that sense, including helping charities provide Eye Care in some of the world's poorest countries.

Franco Sonnino, a long time Canon Medical distributor for Italy, explained how the company is helping him re use second hand material to improve Eye Care in the Central African Republic (CAR) and Mozambique.

Canon's R-30 Autorefractor, TX-20 Full Auto Tonometer and Autolensmeter Oftas One have been deployed in the Mama Carla Clinic in Bangui, CAR, and Maputo, Mozambique, to help prevent blindness and vision impairment.

This is all thanks to Franco Sonnino, founder and former CEO and President of FRASTEMA srl, a long time distributor for Canon Medical in Italy. For over three decades, Franco helped supply Canon technology in his country, but three years ago a project caught his attention and made him deeply reflect on his activities.

“With Canon Tonometer, we’re getting closer to our goal of screening as many people as possible for glaucoma and cataract.”

Franco Sonnino, CEO and President of FRASTEMA ophthalmics srl, Eye Care provider, Italy.

“I was very happy to do my job to develop and sell high quality products such as Canon’s, but the world was running too fast for me, with big evolutions in software, computer science and

commercial issues,” he said. “I started to look for new ways to be useful and give a pleasant sense to the end of my life. By chance, I received a call from a non-governmental organization (NGO), inviting me to help build a refracting room and install ophthalmology instruments in Bangui. I said to myself: why not?”

Screening for glaucoma, cataract and AIDS

Franco helps local ophthalmologists and opticians provide basic Eye Care, by collecting second hand equipment from former esteemed customers, including Canon.

The biggest emergency in CAR is to screen for glaucoma and cataract, two widespread diseases that can cause lower eyesight and blindness. In Mozambique, Eye Care instruments also help diagnose and manage AIDS, which affects 60% of the population.



Biography

Franco Sonnino, born in Imperia on 17-5-1950 is the founder and former CEO and President of FRATEMA ophthalmics srl, a leading Eye Care provider in Italy and one of Canon Medical's key distributors in the country. For the past three years, Franco has helped Amici per il Centrafrica (Friends for CAR (Central African Republic)), a non governmental organization (NGO), to collect ophthalmology equipment and improve Eye Care in CAR and Mozambique.



“The management of Canon Medical has always supported me in this nice adventure after my retirement from business.”

Franco Sonnino, CEO and President of FRATEMA ophthalmics srl, Eye Care provider, Italy.

Installing the equipment was a challenge at first, but the center is now running and helps makes a difference in local Eye Care. “The center is working well and we are consigning good quantities of glasses,” Franco explained.

The clinic in Bangui is equipped with a chair and a stand refracting unit, with chart projector slit lamp; all the before mentioned Canon Medical equipment; and other refraction instruments.

The addition of a Canon Tonometer has definitely improved screening

capacities in both children and adults. “With Canon's Tonometer, we're getting closer to our goal of screening as many people as possible for glaucoma and cataract,” he said.

Support is key

CAR and Mozambique have to be supported in just about anything to improve healthcare and alimentation. “People need everything, they have no public healthcare,” he said.

“They are starving while sitting on incredible natural resources like uranium, diamonds and gold. The World

Food Program is doing many efforts in this direction, but it's not enough.”

Local populations also need support in medical education and training, to help them diagnose and manage diseases locally. Prof. Yaya is the only ophthalmologist in CAR, and he is currently training five students in Bangui.

The work done by Franco Sonnino, local doctors and the Friends of CAR NGO adds another brick to the edifice. The involvement of prestigious medical companies like Canon Medical in such initiatives is an amazing asset, Franco believes.



“The management of this wonderful company has always supported me in this nice adventure after my retirement from business.” he said. “I hope we can go on this fantastic cooperation.”

Franco will return to Bangui in February, to upgrade the mission and pediatric dispensary with new instruments and new staff for the clinic.

“We will do the maximum, but the way is still a long and winding road.”

Canon will sure continue to help him in that endeavor. //



left: Senior Physician Dr. Martin Drerup, University Department of Urology and Andrology.
Right: Chief Physician Prof. Lukas Lusuardi, University Department of Urology and Andrology.
Salzburg University Hospital, Austria.



VISIONS spoke with Chief Physician
Prof. Lukas Lusuardi and Senior Physician
Dr. Martin Drerup, University Department
of Urology and Andrology at Salzburg
University Hospital, Austria.

Better Resolution = Better Patient Care

Prof. Lukas Lusuardi is Chief Physician at the University Department of Urology and Andrology at Salzburg University Hospital (Salzburger Landeskliniken, Austria). Together with Senior Physician Dr. Martin Drerup, he provides a glimpse into the department's tasks and the use of imaging technology.

The University Department of Urology and Andrology at Salzburg University Hospital (Salzburger Landeskliniken) in Austria is the showcase urology department for the entire province and hence also remotely oversees most urology patients. "Our medical spectrum covers all of urology, and our ultrasound equipment is used for diverse procedures," explain Chief Physician Prof. Lukas Lusuardi and Senior Physician Dr. Martin Drerup in unison.

Based on these requirements, the selection of medical technology quickly became clear to us: "We need devices that are all-around performers, just like we are." The doctors found what they were looking for at Canon Medical, where they selected

the ultrasound devices Xario 200G and Aplio i700, which are ideally suited for the department's needs.

"We frequently deal with pathologies of the outer genitals. Testicular carcinoma is the most common cancer in young men. The most important requirement sounds simple – to get an ultrasound image with the highest possible resolution," says Dr. Drerup. The Xario 200G fully demonstrates its strengths in this respect. Not only is it compact and intuitive in its use, it also features exceptionally powerful imaging. The foundation of the Xario 200G is the High Density Beamformer, which enables technologies such as precision imaging and SMI as well as real-time compound imaging ApliPure+ and broadband harmonic imaging differential THI.

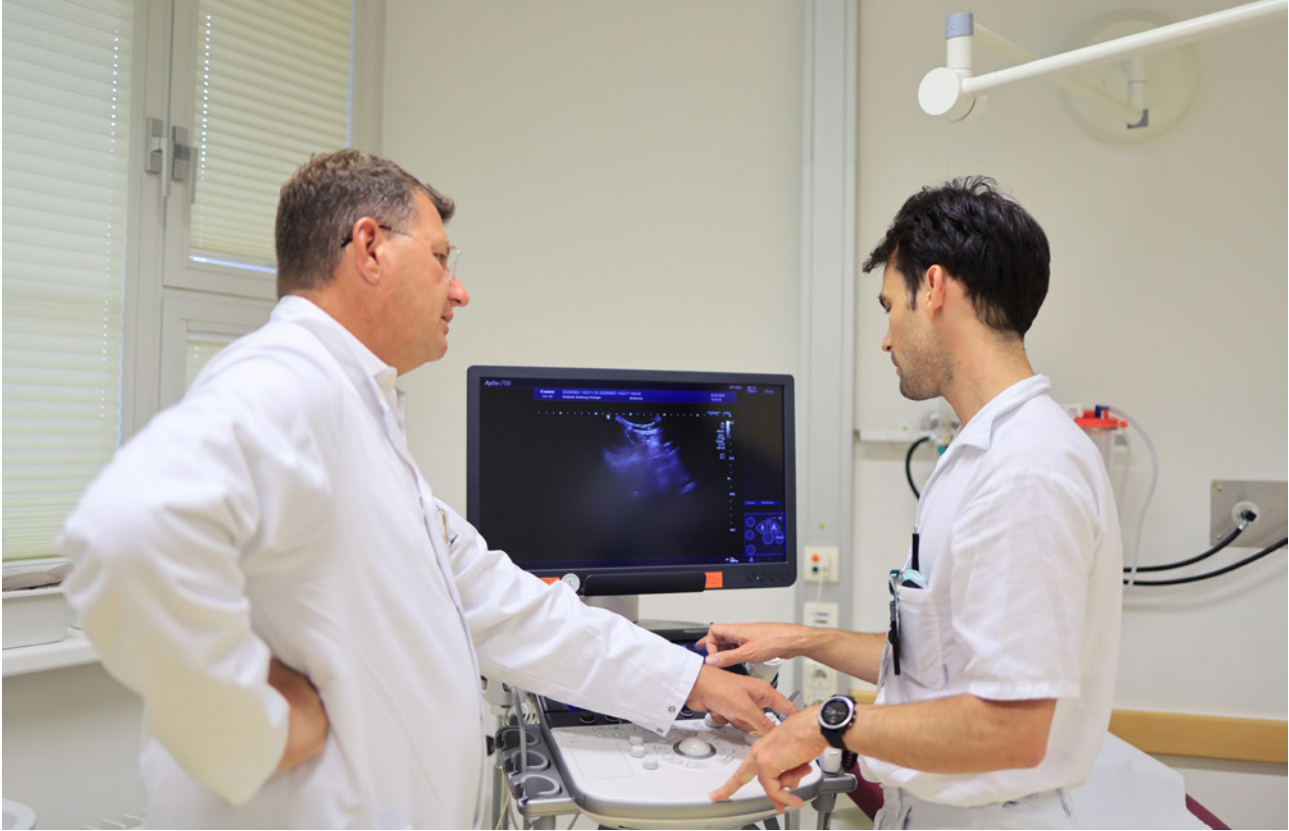


Image management, integrated onboard reporting and various network functions as well as up to 8 hours of battery life and a 2-second boot-up time, make the Xario 200G a high-performance 'team member' in the urology department and a perfect partner for all-around tasks. Together with the Aplio i700, clinical requirements can be optimally fulfilled.

Good visibility is indispensable

The second largest field of activity for which the experts cannot do without ultrasound is interventional urology.

Patients with acute or chronic urine flow problems can benefit from a

percutaneous nephrostomy, which entails the imaging-assisted placement of a catheter. "It's important for the individual components to be easily sterilisable or made from disposable materials. It makes our work easier if the equipment and accessories all come from the same place," Prof. Lusuardi and Dr. Drerup agree. The fact that high resolution plays an important role here is practically self-evident: When we insert drainage tubes or make punctures, we need good visibility of the vessels.

Fusion biopsy for prostate cancer is a frequent area of application for ultrasound. "The objective is to find the best

treatment for each individual patient," says Prof. Lusuardi. And this works best with an MRI-guided fusion biopsy, during which tissue samples which were previously remarkable on the MRI scan are removed in a targeted manner using ultrasound imaging.

To improve the accuracy of the exam, the MRI and ultrasound images are superimposed on each other. The MRI scan serves as 'visual support' to permit improved navigation within the higher-resolution ultrasound visualisation. Due to the accuracy, not only can we detect a higher number of clinically relevant tumours, we can also reduce the amount of biopsies. //



"We need devices that are all-around performers, just like we are."

Where do you see the current importance of ultrasound diagnostics within the context of new technical developments of other imaging procedures?

Prof. Lusuardi: Thanks to its fast diagnostic capability and availability, the importance of ultrasound in urology is constantly increasing. Ultrasound is quite simply a workhorse – for example, in the daily routine at the ward, not a lot will change with respect to follow-ups in the post-operative setting.

Which trends and developments do you see in the area of ultrasound diagnostics for urology?

Prof. Lusuardi: That's quite clearly fusion biopsy. For outer genital pathologies, ultrasound will remain the method of choice despite improved cross-sectional imaging. The same applies to kidney stone removal, in my view. In the core urology areas, ultrasound won't soon be replaced by cross-sectional imaging.

What are your requirements for ultrasound equipment in general?

Dr. Drerup: We've compared multiple devices, and intuitive operation is top priority. And another requirement was recently added: The equipment components must be easy to clean and/or disinfect.

Which requests would you have for the application team or what type of support do you expect for your clinical routine?

Dr. Drerup: The fundamental standard requirements – that is, how the device is operated – need to be demonstrated to every employee. And then there are the special procedures, such as fusion biopsies, where we would like an application expert to be an expert in this field as well. The Austrian team additionally sent us a specialist from their European headquarters for this. That was very helpful for all of us, and we were able to have high-level discussions about the application.

What are the requirements for future ultrasound diagnostics and hence for your colleagues' education and training?

Prof. Lusuardi: There is a big difference between theory and practice. We would hope that everyone receives the same education and training. But in reality it's not always possible during the residency rotation period for everyone to be trained in all urology aspects equally well and for the same amount of time.

Senior Physician Dr. Martin Drerup, University Department of Urology and Andrology at Salzburg University Hospital, Austria.



Chief Physician Prof. Lukas Lusuardi, University Department of Urology and Andrology at Salzburg University Hospital, Austria.

Canon Medical's Customer Survey 2020

For decades Canon Medical has placed the Voice of the Customer (VOC) at the heart of its business. In 2015, the step was taken to be able to respond faster and better to customer feedback and the research was further developed from once a year to a 'real-time' frequency and immediate action management. Since then we have been inviting our customers to evaluate their experience of our Post-Installation Training. In more recent years, we have also introduced customer satisfaction surveys on Delivery & Installation and SOS Service.

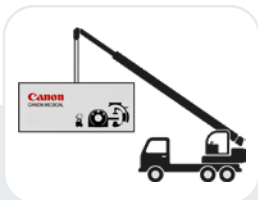
These surveys enable us to gain better insight into customers' needs and the responses provide us with input for possible improvements. Thanks to your feedback, we were able to learn and grow as a company, resulting in the highest satisfaction score to date

for our Delivery & Installation and Training modules!

Towards further improvement of our services, your opinion is invaluable and we hope you will continue in providing us with your feedback!

This time next year, we will feature our 2021 Customer Survey results - Here's to another year of fantastic responses!

We are delighted to share the results of 2020 with you. //



Delivery & Installation

Average Satisfaction

9,4

Recommendation

87% gives a 9 or 10 when asked to what extent they would recommend Canon Medical (from 0-10) to others based upon their experience with Delivery & Installation



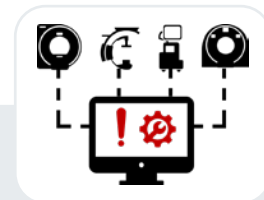
Training

Average Satisfaction

9,4

Recommendation

84% gives a 9 or 10 when asked to what extent they would recommend Canon Medical (from 0-10) to others based upon their experience with Training



SOS Service

Average Satisfaction

8,9

Recommendation

76% gives a 9 or 10 when asked to what extent they would recommend Canon Medical (from 0-10) to others based upon their experience with SOS Service

Why do our customers recommend us?

Delivery & Installation

“Excellent service and ethos of partnership working.”

United Kingdom, X-Ray.

“Competent; both employees and product.”

Sweden, Ultrasound.

“Agility, good customer service and seriousness in project management.”

Spain, Ultrasound.

Training

“Professionalism and knowledge of the instructor and especially the ability to understand and respond to questions!”

Austria, CT.

“The broad knowledge of the trainer and the ease of transmitting this knowledge to the users.”

Spain, X-Ray.

“Image quality, ergonomics of the device.”

Belgium, Ultrasound.

SOS Service

“Efficient technicians who keep me regularly informed of current problems and solutions.”

Switzerland, CT.

“Always receive quick and positive response and resolution to any reported problems.”

United Kingdom, Ultrasound.

“Readiness and quality in response.”

Portugal, MR.

Neurology solutions **Made possible.**

Made For life



At Canon Medical, we have created an entire ecosystem of solutions that foster greater collaboration across multiple teams, departments, and technologies, including advanced AI and healthcare IT, to help you deliver a new level of patient-centered care.

Because we understand that when you collaborate, anything can be **made possible**.