

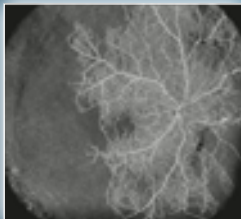
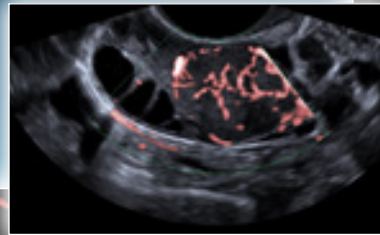
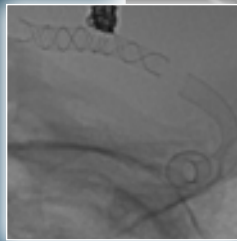
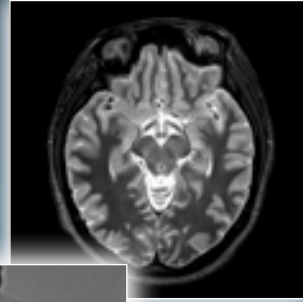
visions

MAGAZINE FOR HEALTH PROFESSIONALS

European Edition // No 37 // September 2021

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Canon



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Vital Images, Inc., will change its company name to Canon Medical Informatics, Inc., in October 2021. This document was created prior to the name change and therefore uses the former company name.

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// EDITORIAL

Dear Reader,

With COVID-19 measures increasingly being eased in many European countries, we are now entering a 'back to a new normal' era.

Over the past year, our lives changed suddenly and drastically. Virtual interactions largely replaced face-to-face contact, and words, like eConsultation, Zoom and Microsoft Teams became prominent in our vocabulary.

Some of these changes made us realize that we can work (more) efficiently in these new ways; we must keep those changes as part of our 'new normal' way of working.

Some others, we will gladly say "goodbye" to. Social isolation, for example, does not work well for us, as a herd animal species.

'Back to a new normal' also comes with plenty of catching up. Catching up on overdue visits to those close to us, catching up on missed holidays, catching up on intentions, tasks, appointments, interventions, diagnosis, treatments etc., all of which have been delayed due to COVID-19 priorities, and, of course, catching up on the latest and greatest in our professional fields.

Our new professional life will likely be one of less travelling, a balanced mix of face-to-face and electronic business- and social interactions, an improved and continuous preparedness for the unexpected, to name just a few elements.

From our side, we are looking forward to meeting you again in person, in your professional environments, and during congresses and exhibitions. We have many things to share, of which some are covered in this new edition of our VISIONS magazine.

In the meantime I wish you well. Remain vigilant and stay safe.

With kind regards,

JOS RUIS

*Chief Operating Officer
CANON Medical Systems Europe*

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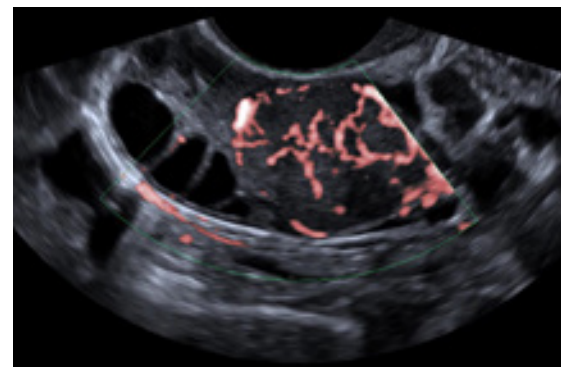


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Canon Medical Solidifies HIT as a Key Growth Pillar

Canon Medical Systems Corporation has recently announced a major operational plan to strengthen its healthcare information technology (HIT) division.

In a world, in which data is a business's most valuable asset, there simply isn't room for silos of any kind. Cohesion, flow, and integration are the watchwords of our time, which is why it should be no surprise to anyone familiar with Canon Medical that they have recently announced a major operational plan to strengthen their HIT division.

The entire reform, which is expected to take some time to complete, will see Vital Images, Inc. adopt the Canon Medical brand to support a more unified business approach. The consolidated business unit will leverage Canon Medical's global infrastructure to accelerate the delivery of multiple Enterprise, AI, and Collaborative imaging solutions.

"This development represents a bold new future for our company, customers and partners," says Toshio Takiguchi, CEO and President of Canon Medical Systems Corporation. "Enhancing our HIT solution and service provision is the

natural next step in a world that demands accurate and immediate results beyond our traditional modality-centered business model."

Jim Litterer, President and CEO of Vital Images, Inc. echoed these sentiments adding: "Canon Medical has a well-established reputation for delivering leading solutions that support the end-to-end needs of the evolving healthcare systems. I am confident that customers around the globe can look forward to enhanced service delivery, uncompromised quality, and an innovative approach to healthcare – which is why I am excited to strengthen the HIT Division, leveraging the global reach of Canon Medical."

Vital Images, Inc. will be fully integrated into the global Canon Medical brand from October 1, 2021. To find out more about our HIT solutions, visit <https://eu.medical.canon/products/healthcare> or contact your local sales representative. //



Webinar Fetal Neurosonography

Last May 2021, Canon Medical hosted the webinar 'Fetal Neurosonography – three essential talks to boost your confidence.'

Fetal Neurosonography is very important as malformations of central nervous system (CNS) are common and can often have a poor neurological outcome. As the fetal brain undergoes tremendous development during pregnancy it can be challenging in differential diagnosis of pathologies and often depend on examiner skills. The main technique for the diagnosis of fetal CNS anomalies is ultrasound. In specific cases, the use of MRI plays a role as well.

Our excellent well-known speakers Prof Laurent Guibaud (Hospital Femme Mère Enfant - University Claude Bernard Lyon/France), Prof Luc de Catte (University Hospital Leuven/Belgium) and Dr Miguel Branco (Bissaya Barreto Coimbra Hospital and University Center/Portugal) explained a detailed multiplanar neurosonography examination, how to differentiate cystic brain lesions and the fetal cortex development in normal and abnormal cases.

This successful webinar was intended to boost confidence and with attendees from 86 countries all over the world joining we saw the high demand for

supporting our customers with high-level education not only performing daily routine ultrasound, but detailed neurosonography scan to improve scanning skills and confidence in the final diagnosis. //



Prof. Laurent Guibaud



Prof. Luc de Catte



Dr. Miguel Branco



Visit our website or scan the QR code:

<https://eu.medical.canon/>

→ Events Calender → Webinars

→ Past Webinars → WHC - Ultrasound

Worldwide Online Course 'State of the Heart in Fetal Cardiology' was a Success!

In 2020, it became obvious that holding face-to-face fetal cardiology courses would be impossible due to the COVID-19 pandemic. Therefore, the collaboration between Canon Medical and the Evelina London Children's Hospital plus King's College Hospital, London, UK, was translated into the comprehensive online course "State of the Heart in Fetal Cardiology". The course comprised of eight two-hour sessions, run every two weeks from January to May 2021.

The course covered all major facets of fetal cardiology, including normal cardiac patterns, features of major groups of structural abnormalities, and fetal arrhythmias. Some areas of practice have undergone significant advances, including first trimester scanning, diagnosis of fetal vascular

rings and the introduction of motion-corrected fetal cardiac MRI, which has been pioneered at the Hospital. Novel ultrasound imaging modalities, including Superb Micro-vascular Imaging have had a significant impact in the first trimester and in diagnosis of vascular rings.

With numbers capped at 200 to permit meaningful interaction with the audience, delegates registered from all over the world and could interact live with the panel for each session.

"Prenatal detection and accurate diagnosis of congenital heart disease is essential, because of its potential profound impact," said Professor John Simpson, Professor of Pediatric and Fetal Cardiology at Evelina London Children's Hospital. "We have been

running foundation and advanced courses in fetal cardiology together with Canon Medical for over 10 years. The online course has enabled us to continue this vital education despite the COVID-19 pandemic."

Feedback from the course has been extremely positive, with respect to content, image quality and the faculty-audience discussions. The demand for the course exceeded all expectations and we believe this approach will continue to be an effective complementary means of delivering education, even when things return to a more 'normal' situation. //



Prof. John Simpson



Prof. Gurleen Sharland



Dr. Vita Zidere



Dr. Trisha Vigneswaran



Dr. Owen Miller



Dr. Marietta Charakida



Dr. Kuberan Pushparajah



Dr. David F.A. Lloyd



Dr. Thomas Day



Dr. Ioana Dumitrascu-Biris

Canon Webinars 2021

Learn from the experts and gain new insights

In online educational webinars, leading experts share their expertise and exchange knowledge. Register to join one of our upcoming webinars or visit our website to watch the past recorded webinars.



Or scan the QR code for the complete online overview.

November 18 **Eye Care OCT (Dutch)**

November 9 **Ultrasound (MSK)**

October 26, 27, 28 - November 3, 4 **Online Cardiology Days**

- Day 1 - Oct 26 | Cardiovascular disease - New Imaging Approaches | Eye Care/MR/CT
- Day 2 - Oct 27 | Cardiovascular disease - Complex Imaging Procedures | MR/CT/HIT/VL
- Day 3 - Oct 28 | Structural Heart Disease | UL/CT/VL
- Day 4 - Nov 3 | Pediatric Cardiology | UL/CT/VL
- Day 5 - Nov 4 | Sports Cardiology | UL/VL

September 30 **Eye Care OCT**
The clinical benefits of scanning wider and deeper in the retina.



Dr. Mahtab Zamani



Prof. Neil D. Pugh



Dr. Grant Mair



Dr. Anton Meijer



Dr. Joseph Puig



Dr. Nevla Caputo



August 24, 25, 26 - September 1, 2

Online Neurology Days



Prof. Adnan Siddiqui



Dr. Andrés González Mandly



Dr. Benoît Doche de Laquintane



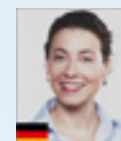
Prof. Bart van Wijmeersch



Prof. Thomas Tourdias



Prof. Nens van Alfen



Dr. Alexandra Borchert

Interpretazione Clinica su OCT e OCTA nella Pratica Quotidiana

15 Luglio, 2021 | 19:00-20:00 CET




July Eye Care Webinar (Italian)



Dr. Barbara Parolini

Post-COVID Conditions

July 13, 2021 | 19:00 (CET) / 13:00 (EST)




July
Webinar



Prof. Joao Lima



Prof. Mickaël Ohana



Dr. Yoko Kato



Prof. Leopoldo Pérez de Isla



Prof. Laurent Feldman

Managing Challenges in Orthopaedic Implant Imaging

June 17, 2021 | 19:00 CET




June
X-Ray Webinar



Lars Lindgren

De Complementariteit van MRI en Echografie; Een Enkel Onderzoek

10 juni 2021 | 19:00 CEST




June
Echografie / MRI Webinar (Dutch)



Dr. Bas Maresch



Dr. Kurt Vanderdood



Dr. Jan Verysen

Ecografía Avanzada en la Valoración del Daño Hepático

13 de Mayo, 2021 | 19:00-20:00 CET




May
Seminario web Ecografía (Spanish)



Dr. Pedro Mora Sanz



Dra. Marta Abadía Barnó



Dra. Gloria Ruiz Fernández



Dr. Antonio Oliveira Martín

Redefining MRI: Unleash Smart AI Solutions to Enhance Your Diagnostic Confidence and Increase Throughput

May 11, 2021 | 19:00 – 20:00 CET




May
MRI Webinar



Prof. Dr. Alberto Aliprandi



Prof. Dr. Reinhard Tomczak

**Fetal Neurosonography
Three Essential Talks to
Boost Your Confidence**

Ultrasound WHC Webinar
May 6, 2021 | 19:30 - 21:00 CET




May
Ultrasound WHC Webinar



Prof. Laurent
Guibaud



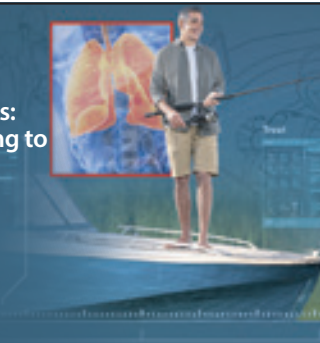
Prof. Luc de
Catte



Dr. Miguel
Branco

**CT for COVID-19 Patients:
From Emergency Triage to
Follow-up Assessment**

April 29, 2021 | 19:00-20:00 CET




April
CT Webinar



Prof. Antoine
Khalil



Dr. Russell
Bull



Dr. Monique
Brink



Prof. Ernesto
Di Cesare

**High resolution imaging
in challenging
MSK examinations**

MSK Ultrasound Webinar Series
April 22, 2021 | 19:00-20:00 CET




April
MSK Ultrasound Webinar



Dr. Jan
Veryser



Prof. Dr. Karsten
Knobloch

**Advanced application &
Interpretation of OCT and OCT
Angiography in clinical practice**

March 25, 2021 | 19:00-20:00 CET




March
Eye Care Webinar



Prof. Tariq
Aslam



Dr. Orlaith Mc
Grath



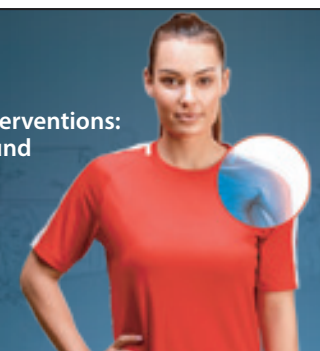
Dr. Sal
Rassam



Dr. Barbara
Parolini

**Ultrasound & Guided interventions:
High-resolution ultrasound
of shoulder**

January 14, 2021 | 19:00 CET




January
MSK Webinar



Dr. Jan
Veryser



Dr. Ramon
Balius



Visit our website to view the complete overview online and to stay up-to-date about changes or newly added webinars!

President's message



Let me start by expressing my deepest thanks for your continued patronage and the work of our valued health care practitioners as they fight against COVID-19.

If I had to sum up the last few months in two words, they would be gratitude and success. It was recently announced that former employee, Mitsue Miyazaki, had been awarded the Medal with Purple Ribbon at the Medal with the Spring of the Third Year of Reiwa in recognition of his pioneering work in medical imaging. Mitsue Miyazaki, who now holds an esteemed position at the University of California, San Diego, was instrumental to the development of an MRI device that can visualize blood vessels without the use of contrast media – making MRI significantly safer for patients with kidney and liver dysfunction.

In addition, Canon Medical has been awarded the National Invention Award for the Third Year of Reiwa, the Gift

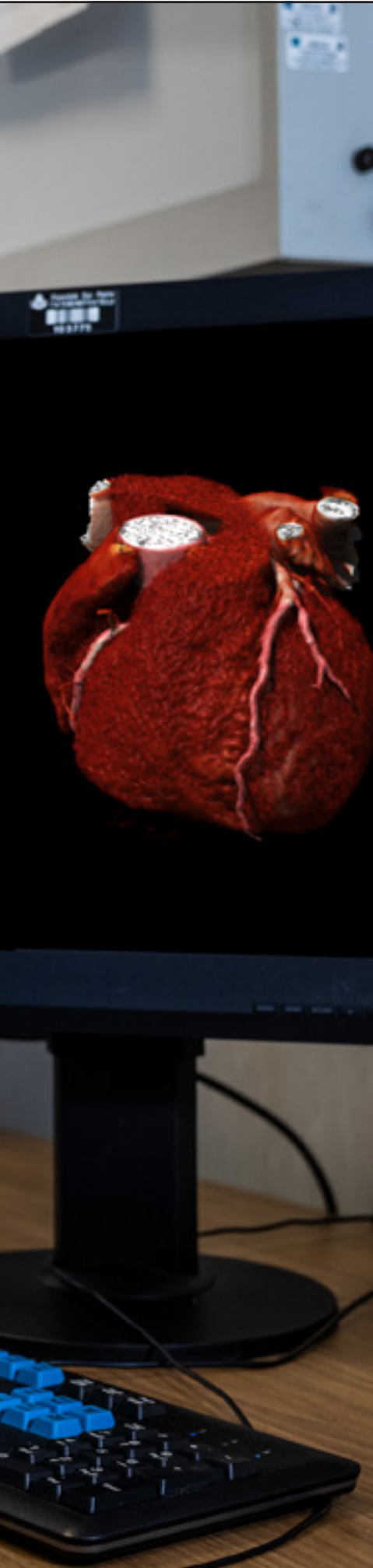
Invention Award, and the Invention Implementation Achievement Award for its creation of a data reading method for large-field CT detectors. This technology, which was key to the development of our high-end CT systems, enables clinicians to image the entire heart and brain in just one scan – thereby reducing exposure dose and pushing the potential of CT beyond its limits.

I am extremely proud of all those who played a part in this great achievement, and I remain ever grateful to the work you do in service of our Made for Life philosophy. Thank you once again and I wish you every success moving forward.

A handwritten signature in red ink that reads "Toshi Takiguchi". The signature is fluid and cursive, written on a white background.

TOSHIO TAKIGUCHI
President and Chief Executive Officer
Canon Medical Systems Corporation





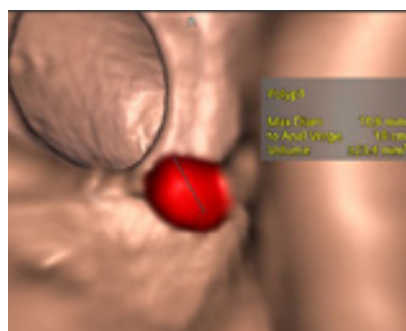
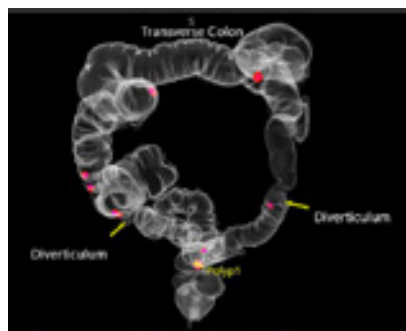
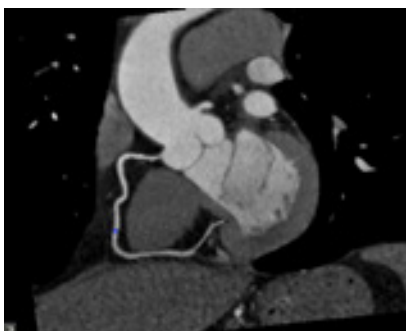
*VISIONS spoke with Prof. Bellelli,
Head of the Radiology Department at
the San Pietro Hospital, Rome, Italy.*

Providing a Hub to Advance Interventional Radiology

Rome in Italy has emerged as one of the world's centers of Interventional Radiology expertise, and the San Pietro Hospital, located in the north of the city, makes a significant contribution. Focusing on several specialisms including Oncology, Pediatrics, Women's Health, Obstetrics, and Musculoskeletal (MSK) surgery, it has a strong team of Interventional Radiologists led by Professor Alberto Bellelli. He explained to VISIONS how a long collaboration with Canon Medical that has spanned two decades has enabled the Hospital to develop as a center of excellence in Interventional Radiology.

San Pietro's Radiology Department has opted for several different modalities from Canon Medical, including CT, MR and Ultrasound - all supported by Vitrea Advanced Visualization (AV) post-processing software). The Aquilion PRIME SP CT is used for all advanced diagnostic examinations, including Cardiac and

Oncology. The Astelion Advance CT is primarily used for MSK Interventional Radiology procedures, often in combination with Smart Fusion. The MR systems (Vantage Titan and Orian) are used for all specialties. Vitrea connects all the modalities, collects all the information that is obtained, and consolidates this into a single report.



Quality and integration

Prof. Bellelli has found that the quality of the cardiac examinations obtained from the Aquilion PRIME SP and Vantage Oriion is very high, and Vitrea AV maximizes and consolidates the information that the specialists can obtain from the tomographic images.

“Vitrea AV streamlines the post processing of the cardiac examinations and the radiologists and the cardiologists using the system are pleased by the quality and presentation of the results, which is fundamental for a highly specialized department,” he remarked.

Surgical MSK procedures, another core activity of the hospital, are required on a very large number of patients.



“Global Illumination provides an outstanding rendering of the anatomical structures and easy segmentation tools enable a quick method to accurately map all the fracture fragments.”

Prof. Bellelli.

“Global Illumination is a feature that has surprised the hospital’s surgeons. It is the first time they have had the opportunity to interact with such realistic rendering of the displacement of all the bone structures,” said Prof. Bellelli. “3D images are really suitable for the depth of anatomical structure that we need to see. In combination

with the SEMAR algorithm of the CT system and the post-surgical control examination, the images provided are incredible in case of metal implants. Global Illumination provides an outstanding rendering of the anatomical structures, and the easy segmentation enables a quick method to accurately map all the fracture fragments.”

“The possibility to combine images from different modalities is very well-designed,” he continued. “In a department, such as ours, where we use a full range of information sources and modalities in the planning of interventional procedures, this feature is mandatory. Vitrea gives many benefits in modality integration. Ever since my first experience with Vitrea, I could appreciate the smooth workflow that it provides for complex post-processing, in comparison to other products that I have used before. After the selection of the images to be processed, Vitrea automatically extracts the qualitative and the quantitative information needed, according to the specific examination and clinical application. The Radiologist can focus their efforts just on formulating the diagnosis, and not on extracting the information.”

Best independent post-processing

Prof. Bellelli leads a team of 64 collaborators focused on Interventional Radiology procedures. In a broader context, Vitrea also provides post-processing capability that is multi-vendor, which enables the experts to integrate their work more easily.

“I prefer to have all the images directly acquired in my department, on the Canon Medical equipment, but this is not always possible. Sometimes, I need to process examinations that are scanned with the systems of other vendors. Vitrea doesn’t put any limits in the processing of images from other vendors and this provides the possibility to always have the best post-processing, independent of the vendor,” he explained.

“One of the biggest benefits that the Vitrea provides is that it can support full collaboration with other specialists, who are not always certain of images. Vitrea presents information in a very user-friendly and easy-to-understand way, also for specialties that are not confident with radiologic images.”



San Pietro Hospital, Rome, Italy.

Vitre AV has also helped facilitate communication across Prof. Bellelli's clinical team, as the representation of the relevant clinical structures is extremely clear. There are currently 16 radiologists in the Department. All of them support their reports with the Vitrea AV. In particular, the generic vascular

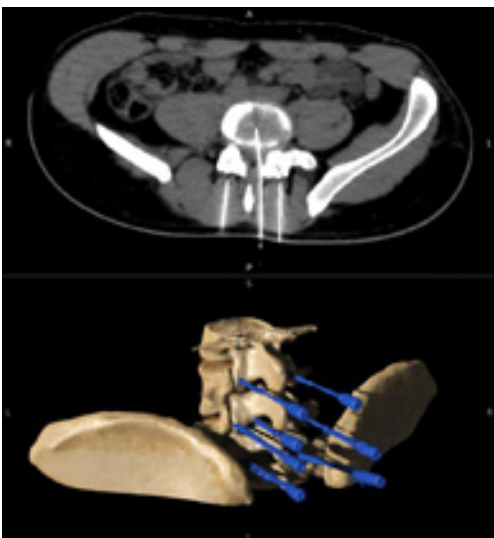
and cardiac examinations require the Vessel Analysis tools. Communication among team members is also facilitated for MSK surgical planning, in which the Radiologist is required to provide a clear representation of the anatomical structure to enable the surgeon to choose the best surgical approach.

"Of course, the most important benefit is in the improvement of selecting the most suitable Interventional procedure in order to avoid, or limit treatment complications," added Prof. Bellelli.

Key role in continuous development

Prof Bellelli started working with Canon Medical twenty years ago. During this time, the relationship has been consolidated through continuous support of Canon Medical's team in training, advanced clinical sessions and problem solving. Prof. Bellelli has been able to improve and develop his clinical protocols with the support of Canon Medical's experts.

"Canon Medical plays a key role in the planning and ongoing development of our Radiology Department. And continuous dialogue and collaboration between Canon Medical and our hospital in terms of new technologies and deployments is essential for the realization of our vision," said Prof. Bellelli.



MSK interventional procedures.



Biography

Prof. Bellelli is the Head of the Interventional Radiology department of the San Pietro Hospital, in Rome, Italy, and has been working for the past 30 years in the fields of diagnostic radiology, emergency and later specializing in pain therapy, diagnostic and therapeutic treatment of lumbar and joint pain. He has joined San Pietro Hospital in 2018, where he is now leading a team of 64 collaborators focused on interventional procedures.

“In combination with the SEMAR algorithm of the CT system and the post-surgical control examination, the images provided are incredible in case of metal implants.”

Prof. Bellelli.

“Our aim is to provide the best patient care, but at the same time there is a necessity to optimize the efforts of the internal resources to guarantee the best possible experience to the patient. To achieve this result, it is mandatory to implement a fast and reliable modality integrated solution across all the imaging devices in the department. The department of today

must also aspire to the department of the future. This means that all modalities installed must be open to further implementation and upgrade to ensure that the clinical offer to patients is always ‘state-of-the-art’. Efficient workflow means that our department is ready for the introduction of the latest technologies,” Prof. Bellelli concluded. //

Diving into the Future of CT with Deep Learning Spectral Imaging

Prof. Catherine Roy

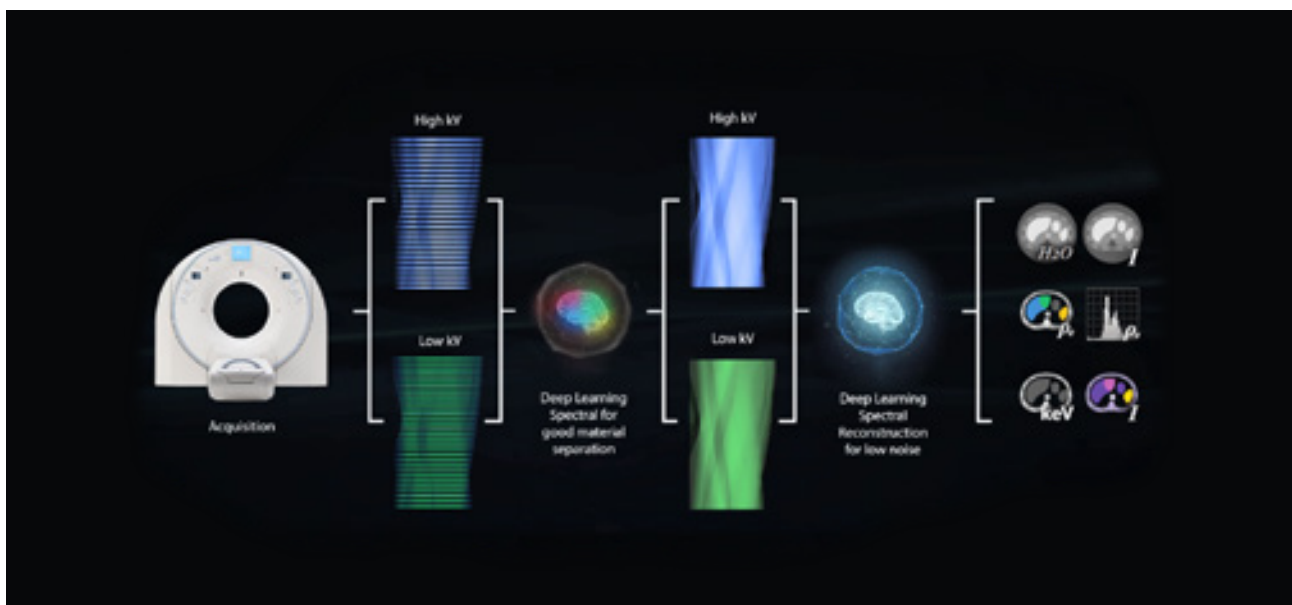
Strasbourg University Hospital is one of the top five research hospitals in France. It is renowned for the quality of its healthcare, clinical research and leadership in training. As a center of excellence in a wide range of specialties including cardiac surgery, transplantation, rheumatology, microsurgery, cryotherapy, immunology and surgical robotics, it contributes to advancing medicine globally. The hospital acquired an Aquilion ONE / PRISM Edition CT system from Canon Medical in 2019. Prof. Catherine Roy, Head of the Radiology department at the hospital, explains how its deep learning spectral imaging delivers new diagnostic efficiencies.

The Aquilion ONE / PRISM Edition complements the Hospital's existing Aquilion ONE / GENESIS Edition system, which was installed in 2018.

"With our vast and growing demand for high-quality imaging, our CT systems are at the heart of the hospital. They serve the needs of our numerous radiologists, clinicians and technologists," said Prof. Roy. "Aquilion ONE / PRISM Edition has become invaluable for us, due to its reliability, fast workflow and high versatility. In particular, it has impressed us through key technologies that deliver spectral imaging. The system is so useful that my co-workers are almost fighting to work on the new machine!"

Spectral Imaging

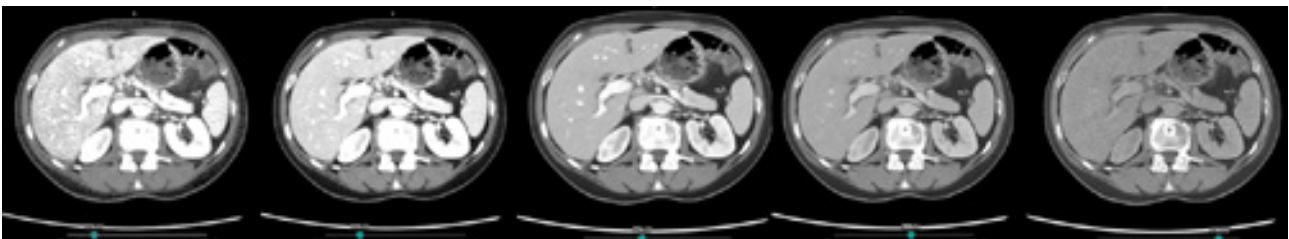
"Featuring a single X-Ray tube with an automatic adaptive exposure, the field of view is up to a 50cm centimeters, and scans be obtained by helical or sequential acquisition. Spectral reconstruction is performed by deep learning. With one click on the Vitrea workstation you can obtain a great deal of information with the spectral analysis application. It's entirely automatic and doesn't take too much time. The Vitrea workstation automatically provides you with a visceral and/or a vascular study. In addition, you can use spectral imaging in multiple body regions," explained Prof. Roy.



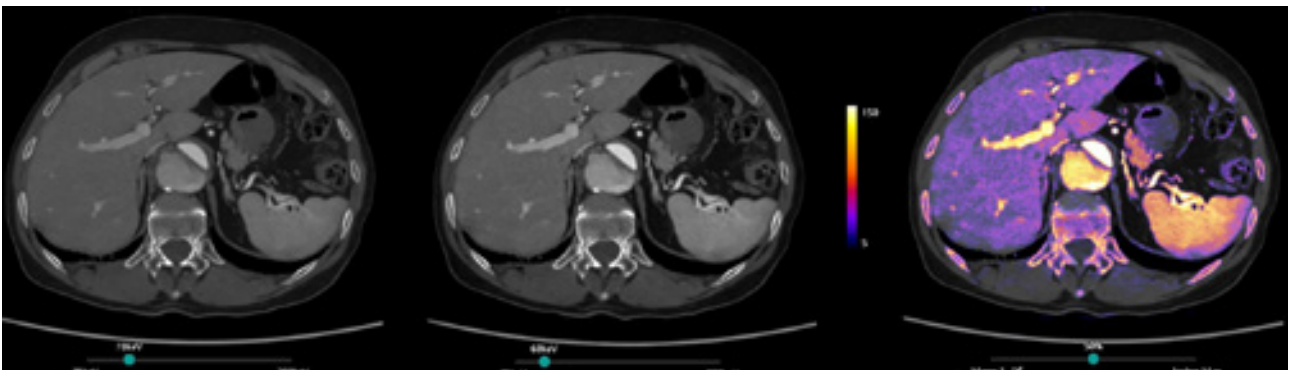
Deep learning spectral scanning, reconstruction and analysis.



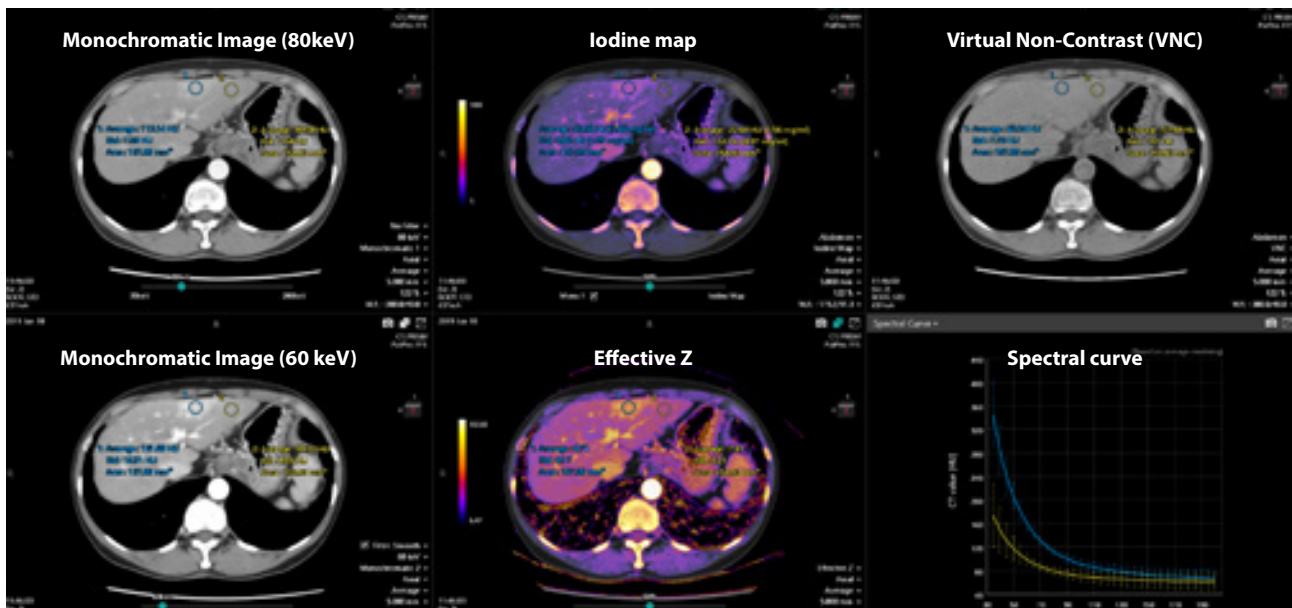
Radiology Team Strasbourg University Hospital, France.



Monochromatic imaging from 35 KeV to 135 KeV showing improved contrast enhancement in the lower KeV images.



Despite the low iodine load of 100 ml of 270 mgI/ml and a flow of 1.3 ml/sec, Spectral CT helps to enhance the contrast at low keV free of noise. It provided an excellent contrast for the evaluation of the aortic dissection (type B).



Vitrea Advanced Visualization Spectral analysis software.

Monochromatic images to see better

One type of image that is available with spectral imaging are high quality monochromatic images.

“We use the monochromatic images to better visualize to contrast on any abnormality. The monochromatic images produce excellent image quality and to visualize iodine uptake even better, you can use a sidebar to adjust the keV level. Using the best contrast-to-noise ratio, you can optimize the contrast inside the suspicious region by placing a region of interest,” she added.

“It’s excellent for detecting abnormalities, even the small ones, and you can decrease the iodine loads, which is also very important. We use the lowest volume or concentration of contrast agent possible. Concerning the radiation dose, it’s quite similar to that obtained with iterative reconstruction.”

Multiple tools to characterize and quantify

The Aquilion ONE / PRISM edition delivers a great deal of additional information that enables Prof. Roy and her team to better characterize and to quantify what they are scanning.

“You obtain an iodine map, which is the information on the iodine uptake; the virtual non-contrast (VNC), with no iodine at all; and you can select an evaluation of the spectral curve by placing a region of interest and evaluation of the effective Z image or electron density image. With these three elements, you can differentiate contrast enhancement from non-contrast enhancement. With the VNC, you can avoid the non contrast acquisition that was previously done,” she continued.

“The best descriptive classification of the Aquilion ONE / PRISM Edition CT is - Versatility for all diagnostic purposes.”

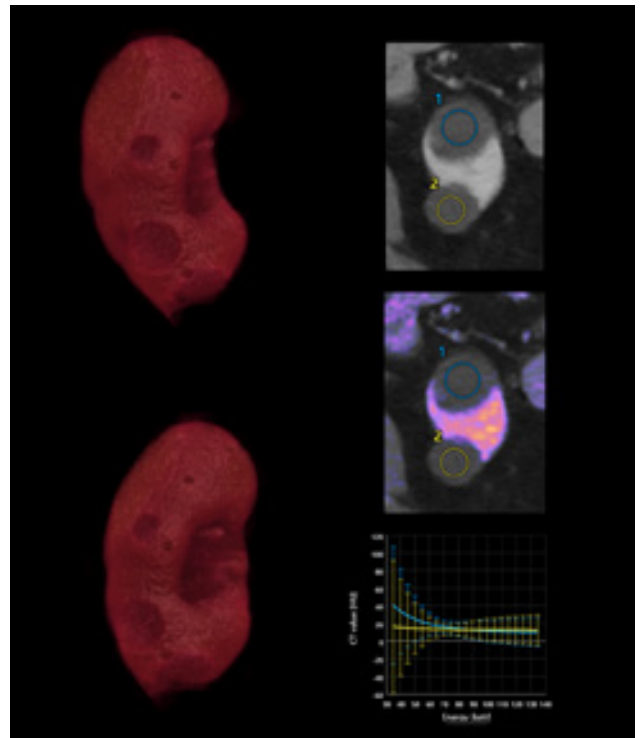
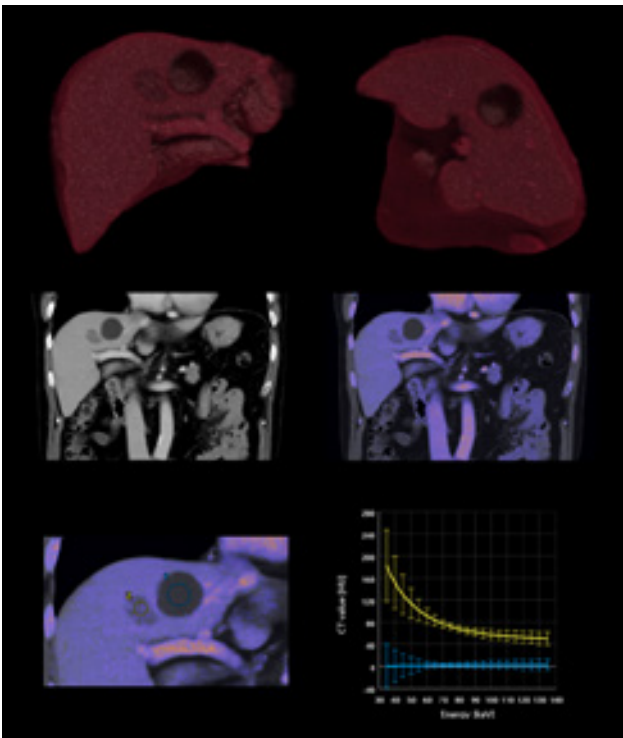
Prof. Catherine Roy, Head of the Radiology department at the Strasbourg University Hospital, France.

“Supplementary information available with the software is to have the quantification of the iodine load in mg per ml. You can obtain the spectral curve by placing a region of interest inside the tissue.”

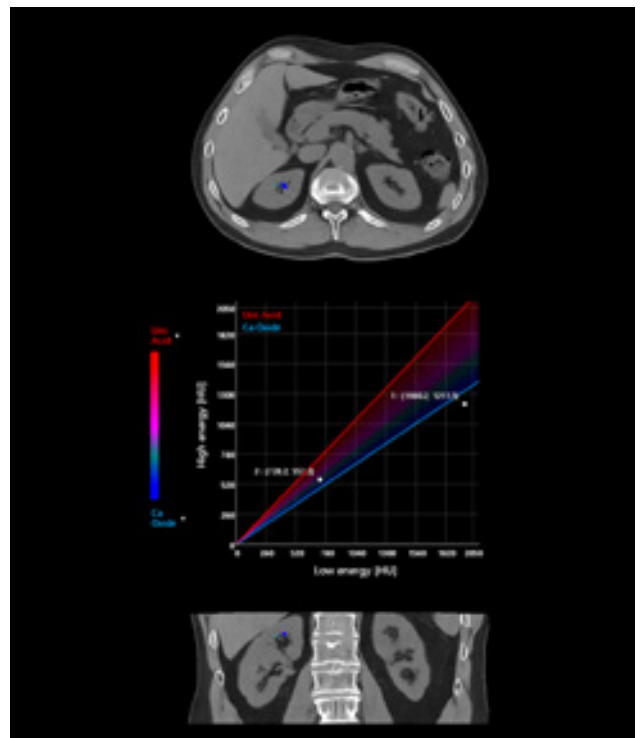
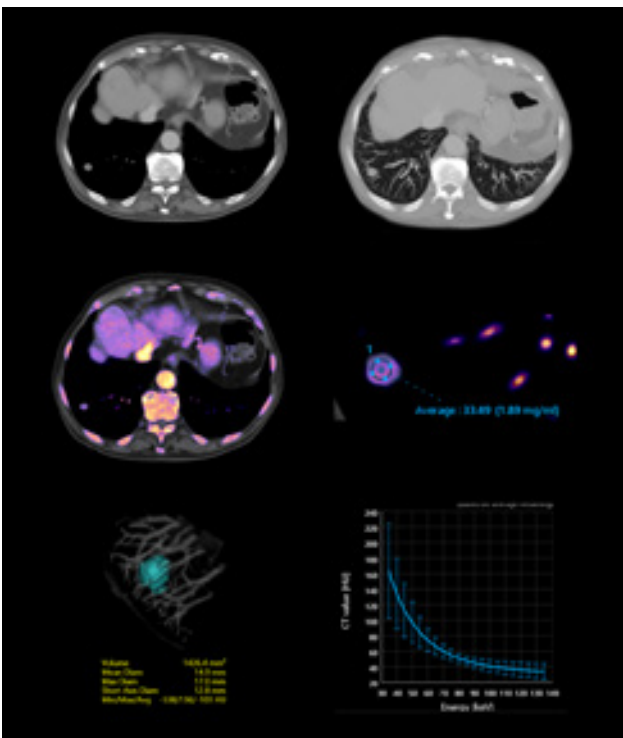
“Additionally, iodine maps improve visibility of nodules with iodine uptake. For examinations, like scanning for kidney stones, the software is very easy to use. In the future, I guess that we will have a better evaluation of tissue perfusion, for instance: for the follow-up of oncologic patients and to prove that there is an efficiency of antiangiogenic treatment. Or perhaps for immunotherapy. With just only one injected phase, you can characterize tissue.”

Extraordinary Images

The Aquilion ONE / PRISM Edition has been able to meet the needs of the whole team at the Hospital.



Deep Learning Spectral CT used to evaluate liver and renal masses. Spectral DLR delivers excellent energy separation, enabling assessment of Iodine uptake. Additionally, the Iodine map clearly outlines the regions of Iodine uptake.

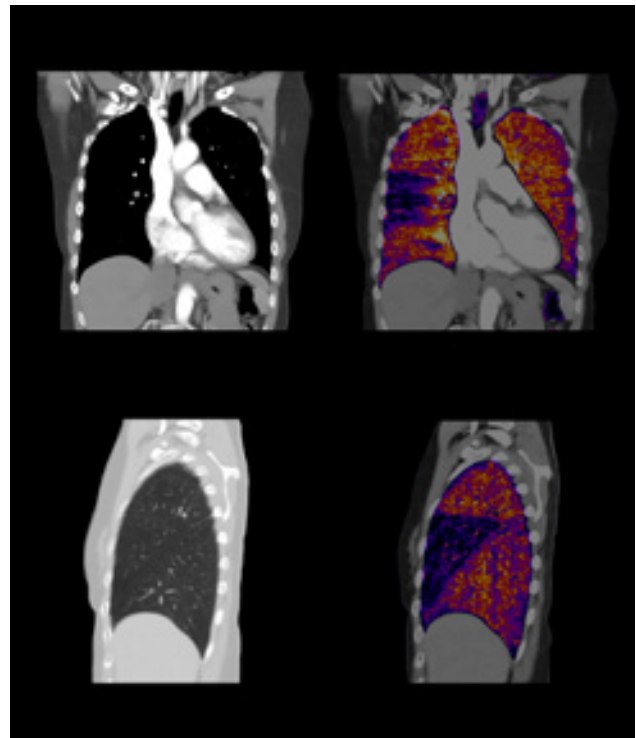


Deep Learning Spectral CT of the lung to evaluate nodules. Spectral DLR delivers excellent energy separation and low-noise properties, enabling assessments of Iodine uptake within the lesions, which can help facilitate assessment of benign vs. malignant lesions.

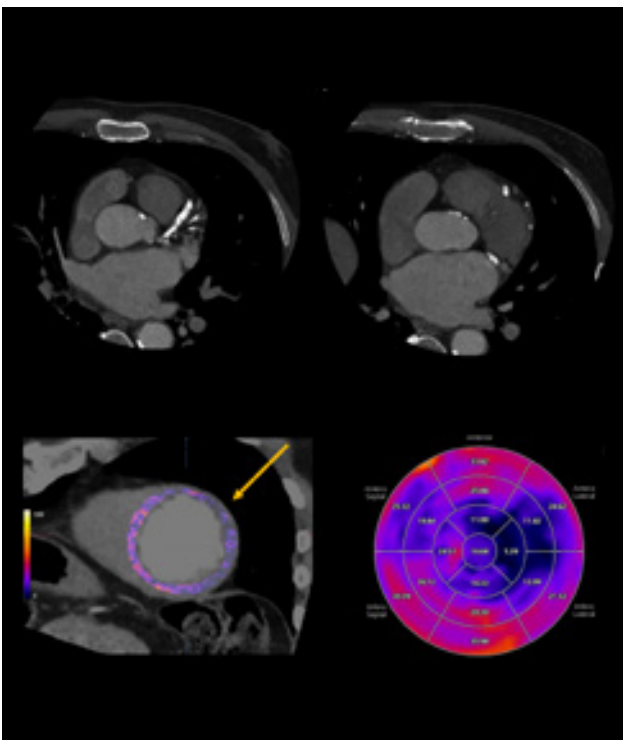
Deep Learning Spectral CT for visualization and quantification of kidney stones. 2 kidney stones are analyzed as calcium oxalate.



Deep Learning Spectral CT of the foot for visualization and quantification of Monosodium Urate (MSU) in the metatarsophalangeal joint of the hallux. Spectral DLR enables volume calculations of the MSU, and color overlay on 3D/2D images for improved visualization of MSU.



Deep Learning Spectral CT for Pulmonary Embolism assessment. Spectral DLR delivers excellent energy separation and low-noise properties, enabling assessment of perfusion defect within the lung parenchyma, associated with the pulmonary emboli. Courtesy: Kyorin University, Japan.



Myocardium Iodine Maps helps to evaluate the attenuation of the hypo-enhancing area compared to normal myocardium.

“Our clinicians love, and they are very interested by innovative things, especially with spectral imaging. Their feeling is that with this new scanners spectral imaging capabilities, they are more confident with their diagnoses,” said Prof. Roy.

“Our technologists need easy-to-use hardware and software and this is available with the Aquilion ONE / PRISM Edition. They need a reliable scanner, and this is especially true for the Aquilion ONE / PRISM Edition. There have been no problems with it at all. The best descriptive classification of the Aquilion ONE / PRISM Edition CT is - Versatility for all diagnosis purposes.” //



Prof. Catherine Roy
Head of the Radiology department at the Strasbourg University Hospital, France.

Supporting Advances in Gynecologic Oncology

Prof. Antonia Testa

Professor Antonia Testa is one of Europe’s leading experts in gynecologic oncology and has conducted more than fifty research projects on gynecological cancer and chemotherapy protocols. She also founded a world-class school for ultrasound in gynecology in Rome, Italy, that has trained thousands of specialists since its inception. Professor Testa is also Board Member of the International Ovarian Tumor Analysis group (IOTA). Her overall work has contributed to improve early and confident diagnosis in gynecological disease. Professor Testa explained to VISIONS how important Canon Medical’s ultrasound systems are in daily clinical practice and research.

Throughout her career, Prof. Testa has completed pioneering research and advanced gynecology with the help of ultrasound. She graduated in Medicine at the Catholic University in Rome (Italy) and is now Associate Professor of the Institute of Obstetric and Gynecological Clinics at the Catholic University of the Sacred Heart in Rome, Italy and Scientific Director of the Center for Ultrasound in Gynecological Oncology “Class Ultrasound” of the Fondazione Policlinico Agostino Gemelli IRCCS, Rome.

She has been a Board member of the International Society of Ultrasound in Obstetrics and Gynecology (ISUOG) for eight years, and Vice-President of the Italian Society of Gynecology and Obstetrics (SIGO Federation) for two years. Prof. Testa is member of the Steering Committee of International Ovarian Tumor Analysis (IOTA) group.

Ultrasound in research and daily practice

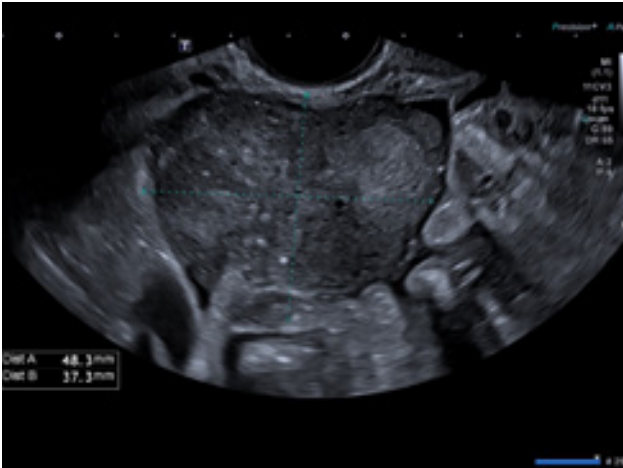
“My story changed significantly in the year 2000, when I met Professor Lil Valentin (Lund University, Sweden), Professor Tom Bourne (Imperial College, London, UK) and Professor Dirk Timmerman (KU Leuven, Belgium). Together with them, I started an adventure that is the International Ovarian Tumor Analysis group (IOTA)” she explained. “We started to prospectively collect data of ultrasound and histology, of patients with ovarian masses and developed mathematical models, like simple rules and ADNEX, to discriminate between benign and malignant ovarian masses. So far, our database includes more than 25.000 cases.”

Prof. Testa has been working with ultrasound engineers to develop new softwares and algorithms to improve the clinical management of patients with gynecological disease. In particular, she has contributed for the integration of IOTA predictive model (ADNEX model) into ultrasound equipment for discrimination between benign and malignant ovarian masses, which is integrated into the Aplio series.

“In addition, through working as part of the gynecology team, I realized the great value of ultrasound in the daily clinical management of our patients. In particular, during follow-up, when we can use ultrasound as a bedside tool. For example, if we have a suspicion of a recurrence, we can check it immediately to understand the nature of one or more lesions and assess the possibility to surgically remove the lesion. In addition we can obtain a biopsy of that lesion to follow up the situation during treatment,” she continued.



IOTA-ADNEX model in case of advanced stage Ovarian Cancer.



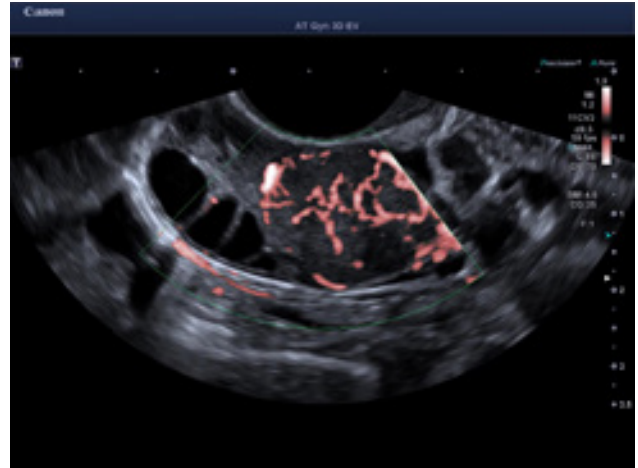
Ovarian Cancer.

“I wanted to share my knowledge with my colleagues, with residents and with students, which is why I created the Center for Ultrasound in Gynecological Oncology “Class Ultrasound” at the Agostino Gemelli University Hospital Foundation in Rome, Italy. Since its inception six years ago, around 2,500 colleagues have attended courses there.” The Center has trained Italian and European physicians and health professionals, provides patients with the highest professional service and plays a key role in multi-center scientific studies.

Celebrating five years of scientific collaboration

This year marks the fifth anniversary of a collaboration with Canon Medical that has brought great results for Prof. Testa’s research and clinical practice, and has helped Canon to advance its ultrasound systems.

“My story with Canon Medical started in 2016 after ISUOG World Congress, which I had the honor to organize. Canon professionals offered me the opportunity to begin a scientific collaboration.



Ovarian Fibroma with flow visualized by Superb Micro-vascular Imaging (SMI).

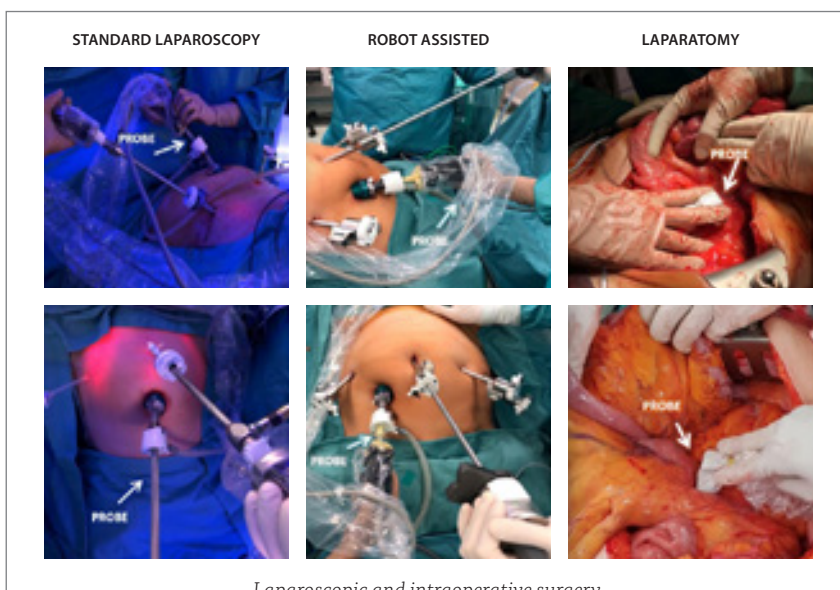
As I am always looking for something innovative I was very happy with their proposal to explore new software and new ultrasound equipment.”

Aplio i700 Women’s Health System

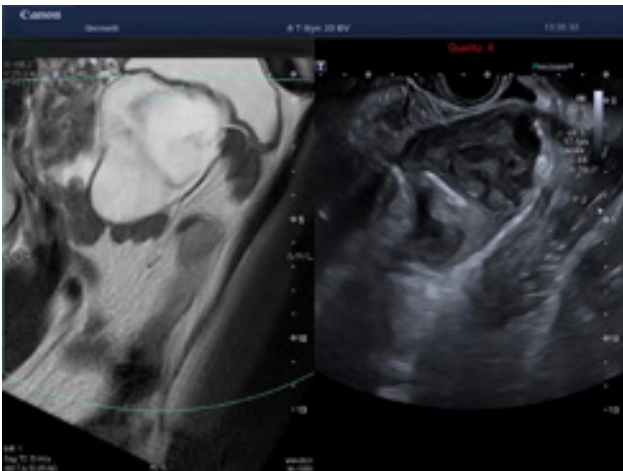
Prof. Testa started to work with Canon Medical’s Aplio i900 ultrasound system at the beginning of the collaboration, which was later exchanged for a dedicated Aplio i700 Women’s Health system when it became available. The School of Ultrasound also have a smaller Canon Medical Xario 200G for evaluation in their surgery department with intraoperative and laparoscopic transducers. Initially, they used the Aplio for this functionality, but instead of moving the system between departments, the Xario 200G was made continuously available in the surgery department. With its smaller footprint, little space was required. Because it runs on batteries, it offers optimal mobility.

“The most important requirements relating to an ultrasound system that I am always looking for are first - resolution, so

high-quality grayscale images. Then, intuitive software, that allows the examiners to use the equipment at its best. In other words, easy-to-manage tools that are not very complicated to use. Then, high-quality vascularization assessment,” she continued. “When I discovered Aplio ultrasound machines, I was fascinated by its very high image quality with crystal-clear images and enhanced penetration. Then I found the equipment very good, able to deliver superb images for a wide range of clinical applications. Moreover, regarding the vascularization, it was amazing to find that the machine had the possibility to detect very, very small vessels, which is crucial for us to discriminate papillary projections or



Laparoscopic and intraoperative surgery.



Smart Fusion Image of Low-Grade Appendiceal Mucinous Neoplasm.

amorphous material, for instance, within an ovarian cyst. I have to say that also the Doppler Luminance is fantastic, because it gives the impression of 3D rendering images.”

Meeting challenges

“In gynecologic oncology there are several challenges for the management of our patients. First, pre-operative assessment: to detect a lesion and to be able to discriminate between benign and malignant; Furthermore to stage cancer, that means not only to see the lesion, not only to understand that it can be malignant, but to assess the extent of the disease. We know that the transvaginal ultrasound examination is fundamental and superior to other sophisticated imaging methods, because of the dynamic examination. It offers the possibility to check the reciprocal movements of other organs, to check for pain, while pushing against the organ, and to assess the deformability of the organ.... these are of utmost importance in the examination of the pelvis.”

“Secondly, the challenge is to have a bedside tool to get a quick assessment to solve some clinical problems, to check for pleural effusion and presence of ascites or do simple procedures, such as paracentesis, drainage of fluid or place intraperitoneal catheters. And thirdly, we discovered that ultrasound can play an important role in the surgical field. As our patients very often had been already treated with radiotherapy, and/or previous surgical procedures, sometimes, it's very challenging to detect a small recurrent lesion located in the lower part of the pelvis, for example. With the transvaginal transducer, we can guide the surgeon to reach that small area. Besides that, Canon Medical provided us with a laparoscopic ultrasound transducer, and this is fantastic, because for some patients with borderline ovarian tumors, for instance, we are able to provide 'fertility-saving' surgery. We can select the area and localize the small lesion in order to spare the largest amount of normal tissue.”

New research possibilities

The systems have also enabled new possibilities in research. “As far as innovation is concerned, I was very interested in the possi-



Prof. Antonia Testa

bility to explore Smart Fusion that fuses Ultrasound with MR or CT images. So, we decided to run a prospective study on patients with cervical cancer and a study in patients with advanced ovarian cancer. We have already published the results on the first study - cervical cancer. We have been analyzing data of a large series of patients with ovarian cancer,” said Prof. Testa. “At the moment, I can say that I'm very happy about this experience and, in my opinion, Smart Fusion can play a prominent role in education. To have the possibility to share the experience, being the radiologist and gynecologist together the same room - It's very important for the improvement of the experience of both disciplines.”

Working on the future

Canon Medical continuously develops its ultrasound systems to provide even better image quality and workflow that enable clinicians to advance medicine. One important aspect is integrating Artificial Intelligence (AI) enabled technologies into the ultrasound systems in the future. “I look confidently towards the future,” added Prof. Testa. “I really hope that ultrasound equipment will provide us with Artificial Intelligence analysis. With this, we will be able to store a lot of images using a simple method plus define and recognize more of what we cannot do with our eyes and brains.” //

Publications:



¹ **Intraoperative ultrasound diagnosis of metastatic lymph node in serous borderline ovarian tumor**

De Blasis I, Tortorella L, Macchi C, Arciuolo D, Scambia G, Testa AC (UOG 2019).



² **Ultrasound Technologies in the diagnosis and treatment of ovarian cancer**

Antonia Testa, Canon Medical webinar at ISUOG World Congress 2020.



³ **Fusion imaging of ultrasound and MRI in the assessment of locally advanced cervical cancer: a prospective study**

Moro F, Gui B, Arciuolo D, Bertoldo V, Borzi R, Romeo P, Petta F, Cambi F, Pasciuto T, Zannoni GF, Valentini V, Manfredi R, Scambia G, Testa AC Italy (IJGC 2019).

Taking a Qualitative Leap Forwards



Dr. Jordi Catalá March and Dr. Jorge Salmerón Pintos.

Instituts Guirado in Barcelona, Spain, is a high quality medical imaging center at the forefront of radiology. It is dedicated to providing rapid, accurate and trustworthy diagnosis through continuous commitment to investment in the latest technology, an optimized center for patients, and support from its highly skilled medical and professional team. With the latest MRI, CT and Ultrasound technology from Canon Medical, the diagnostic center can improve its services and knowledge even further. Dr. Jordi Catalá March, Executive Director - CEO of the Instituts Guirado, explained how the systems have supported a qualitative leap in many diagnostic procedures.

Across its seven facilities in Barcelona, the diagnostic center has recently acquired one Vantage Galan 3T MRI with Advanced intelligent Clear-IQ Engine (AiCE), one Vantage Titan 3T MRI, three Vantage Elan 1.5 T MRI systems, one Aquilion Lightning SP CT with AiCE and two Aplio a-series Ultrasound systems from Canon Medical.

Shared medical philosophy

Instituts Guirado is a company created and directed by doctors.

“We think like doctors, and combine technology, research, and academic publications, to provide the highest standards of comprehensive and innovative care in everything we do,” remarked Dr. Catalá March. “We were looking for a technological partner that would share

our medical philosophy, and in particular, share our objective to get the most out of the images we acquire, enabling us to, for example, improve the diagnosis of tumors by detecting them earlier, map articular cartilage, and perform brain volumetric studies. We can achieve these things with tools that leverage Canon Medical's innovative technology that utilize AI and Deep learning.”

Technology to serve both patients and medical team

Dr. Catalá March appreciates the constant improvement that is made possible through Canon technology and ongoing collaboration with Canon Medical.

“Just as an example, Canon Medical's Deep Learning has allowed us to go further in diagnosis and patient care

through enabling examinations with 80% less radiation dose, 40% less dose of iodinated contrast, and higher image quality. This is what we are looking for: technological changes that are beneficial for patients and for the medical team,” he explained.

Qualitative leaps forward in CT and MRI

The Aquilion Lightning SP has enabled the diagnostic center to take a qualitative leap forward. With a multi-slice detector, allowing a minimum thickness of 0.5mm; simultaneous acquisition of data with 160 slices in a single rotation; 3D and MPR images with a precise and uniform level of detail can be obtained in routine scans.

“It is really important that patients are scanned with a minimum exposure time, and with a minimum radiation dose, which is adjusted at all times to the anatomical region studied and the size of the patient's body. And, of course, that the CT produces excellent image quality, from which the patient benefits through more accurate diagnosis and a lower radiation dose,” said Dr. Catalá March.

“With our new acquisition of the latest generation, Canon Medical's MR system the Vantage Galan 3T, we have taken a great qualitative leap in our protocols, expanding new sequences that improve diagnosis - changing diagnostic paradigms in some of our processes. Particularly relevant is the integration of AI through Canon's AiCE technology,” he continued.



Dr. Jordi Catalá March with Canon's Vantage Galan 3T MR system.



“Equally important, is the possibility to perform comfortable and silent examinations using new techniques, from which the patient gains in

comfort and in much shorter scanning times, all thanks to the rapid acquisition of Compressed SPEEDER for 3D sequences. Another aspect to

highlight is the wider gantry diameter, which is a help for claustrophobic and obese patients. We also have advanced post-processing.

“By using the latest systems and techniques developed by Canon Medical, we have been able to remain at the forefront as leaders in diagnostic imaging.”

Dr. Jordi Catalá March, Executive Director - CEO of the Instituts Guirad, Barcelona, Spain.

Continually advancing

The collaboration agreement with Canon Medical Systems allows the Instituts Guirado to constantly update the latest diagnostic techniques, such as, tractography, functional studies and MRI-Neurography, etc.

With the Vantage Galan 3T MRI, in particular, the diagnostic center has been able to add more sequences that add great value.



“One example of this is our studies of Meniere’s disease and hydrops, which we have carried out for some years. The high resolution and post-processing of the acquired images, allows us to detect changes that have not been visible until now, related to pathologies in the membranous labyrinth.”

Another example is in oncology studies. The acquisitions achieved with Compressed SPEEDER for 3D technology, AiCE - Deep Learning, Atlas SPEEDER coils and all MRI expert packages, offer customization and rigor to these very sensitive diagnoses for the patient.



“Thanks to the technology we currently have we are able to detect haemorrhages, tumors and vascular problems in just a few minutes.”

Dr. Jorge Salmerón Pintos, Medical Director at Instituts Guirado in Barcelona, Spain.

“We continue, hand-in-hand with Canon Medical. Growing and sharing enables us to continually advance. Canon Medical understands our philosophy, listens to our needs, and observes our working methods,” said Dr. Catalá March. “Together, we achieve synergy in our work. We feel very comfortable with Canon’s response to our diagnostic requirements, which are focused on early and better diagnosis leading to optimal treatment, we aim to build a better and healthier future.”

New generation expertise

“The “know how” of an institution provides an active value that we pay a lot of attention to and from Instituts Guirado we promote the acquisition of state of the art technology that gives to the professionals and new talents the tools and the environment we need for our research and continuous training,” said Dr. Catalá March.

Leaders in diagnostic imaging

Over the last six years, Instituts Guirado has strived for excellence in imaging. “By using the latest systems and techniques developed by Canon Medical, we have been able to remain at the forefront as leaders in diagnostic imaging,” remarked Dr. Catalá March.

“Our collaboration with Canon is a commitment to the future, in which the teamwork that we have established brings us great advantages, and ultimately continual progression enabling us to continue to offer an excellent medical service and maximize diagnostic value.” //

Instituts Guirado, Barcelona, Spain

The Instituts Guirado is a high quality medical imaging center for diagnostics located in Barcelona, Spain.

Established in 1977, it is renowned as a leader in imaging, and provides radiology services and diagnostics that span MR, CT, CBCT and Ultrasound imaging, conventional digital radiology, dental radiology, dental 360, sports medicine, rehabilitation medicine, clinical analysis and preoperative imaging. Through use of the latest imaging equipment and techniques, it operates at the forefront in diagnostic imaging.

Headed by Dr. Jordi Catalá March, the Instituts Guirado currently operates more than seven centers in Barcelona. It employs a total of 25 radiologists. In addition to providing a wide range of diagnostics, it is involved in cutting-edge research in radiology and radiology techniques, and has produced the following studies:



Labyrinthine Hydrops. Meniere’s disease. Dr. Jorge Salmerón. Barcelona, 2021.



Complex odontoma. Dra. Araceli Martínez Mirabé Barcelona, May 2019



Transmission and mixed hypoacusia. Dr. Jorge Salmerón. Barcelona, February 2019.



Alterations of labyrinthine signals in the MR acoustic-facial package studies. Dr. Jorge Salmerón. Barcelona, November 2018.



Radiological clinical study. Dr. Jorge Salmerón. Barcelona, October 2018.

<https://www.institutsquirado.com/?lang=es>



Creating a New Platform in CT
The Sainte Elisabeth Clinic in Namur, Belgium, has acquired an Aquilion Lightning SP, an Aquilion ONE / PRISM Edition and an Aquilion Precision.

VISIONS spoke with Dr. Frédéric Alexis
(Head of the Radiology department at
Sainte Elisabeth Clinic, Namur, Belgium)
about the experiences with Canon
Medical's CT systems; the Aquilion
Lightning SP, the Aquilion ONE / PRISM
Edition, and the Aquilion Precision.

A Significant Investment in Canon Medical CT

The Sainte Elisabeth Clinic is one of three hospitals that comprise the CHU UCL University Hospital in Namur, Belgium. The Clinic specializes in oncology and radiotherapy, maxillofacial surgery, implantology and weight-loss surgery, but is also active with other medical and surgical disciplines, including interventional cardiology, dialysis, maternity care and pediatrics. It has recently acquired three CT scanners from Canon Medical, including the first Aquilion Precision in Belgium. Dr. Frédéric Alexis, Head of Radiology at the Clinic, explained how the systems are not only supporting better diagnostic confidence, but also enabling new research.

Which factors were particularly important in choosing new CT scanners?

As we perform a great number of pain clinic and peri-rachial infiltrations, biopsies, and drainage of fluid collections, we were looking for a scanner for interventional imaging.

We also required scanners with the widest anatomical coverage for perfusion, cardiac imaging, and 'difficult' patients, such as elderly people or children, or those with dyspnea. In addition, all our CTs require a large gantry to enable interventional imaging, diagnosis and treatment of bariatric and Intensive Care patients.



Sainte Elisabeth Clinic, Namur, Belgium.



The Aquilion Lightning SP.

Technically, we wanted one of the devices to be equipped with Spectral imaging, and we also wanted to obtain the best spatial resolution.

Ease-of-use for technologists was a very important factor, as well as comfort for patients and technologists. Great capabilities and fast post-processing were also key needs.

Why did you choose these particular scanners from Canon Medical Systems?

The Aquilion Lightning SP, the Aquilion Precision and the Aquilion ONE / PRISM Edition scanners utilize

a similar user interface for image acquisition, the same image production chain, and the same qualitative components. All of them have Advanced intelligent Clear-IQ Engine (AiCE) reconstruction, a large gantry, and are patient-friendly, providing lateral table movement and a very low table height, which is ideal for patients with reduced mobility.

They also offer wide anatomical coverage, which is especially useful for cardiac imaging and cerebral perfusion (as required in cases of stroke). And high resolution for bone and oncology imaging.

Canon Medical offers such high professional standards in all components of its products and services; from technology to construction of the products, and from installation to support.

What did you expect the systems to bring in terms of improvements in daily practice?

Firstly, we anticipated that they would help ease and harmonize the acquisition of examinations for the technologists, thanks to the common user interface of the three CT systems.



The Aquilion Precision.



The Aquilion ONE / PRISM Edition.

A COVID-19 appropriate inauguration of the first Aquilion Precision in Belgium took place on 29 June 2021.

The representatives of Canon Medical during this inauguration were: Kristoff Reyntjens (General Manager at Canon Medical Systems Belgium), Roy Verlaan (European Modality Director CT at Canon Medical Systems Europe), René Degros (Vice President Sales & Marketing at Canon Medical Systems Europe) and Mr. Tetsuya Kawagishi (President and CEO at Canon Medical Systems Europe).



We were expecting fast and efficient post-processing, and user-friendly features. It was important for us to be able to work with reduced dose, or improved image quality. We were also looking forward to exploring spectral imaging.

Have the Canon Medical scanners met these expectations?

Yes. Thanks to training of our technologists that began before the arrival of the scanners, we were able to facilitate rapid use of the new equipment by the majority of our staff that need to use the systems. Other staff were introduced later with progressive installation of the systems.



From left to right: Mr. Tetsuya Kawagishi (President and CEO at Canon Medical Systems Europe), Mrs. Patricia Winandy (Hospital General Manager, Sainte Elisabeth Clinic), Mrs. Yolande Hudsen (Deputy Chief of Staff to the Regional Minister of Health), Dr. Frédéric Alexis (Head of the Radiology department, Sainte Elisabeth Clinic), and Mr Jean-Marc Dieu (President of the Board of Directors of the CHU UCL Namur) cutting the ribbon on the inauguration day.



“Canon Medical offers such high professional standards in all components of its products and services; from technology to construction of the products, and from installation to support.”

Dr. Frédéric Alexis, Head of the Radiology department at Sainte Elisabeth Clinic, Namur, Belgium.



We have been able to develop common examination protocols, but also specific protocols for each system, for example, for use in Ultra-High resolution Ear Nose and Throat (ENT), Musculoskeletal (MSK), and in Oncology for the Aquilion Precision.

We have developed protocols in oncology, vascular, cardiac, perfusion and spectral imaging for the Aquilion ONE / PRISM Edition and Interventional imaging for the Aquilion Lightning SP.

The availability of AiCE on each system guarantees improved image quality and a reduction in radiation dose.

Cardiac examinations have particularly improved, in terms of dose and image quality, even for patients with high heart rates, or when we are not able to use beta-blockers. The Vitrea coronary CTA post-processing is fast and robust. For Interventional procedures, the joystick is easy of use for Dr. Peter Verbeek, (future head of departement and MSK diagnostic

and interventionnal radiologist) - it is more precise and responsive than previous systems, not exposes to any radiation.

What is the most significant difference that AiCE has made to your practice?

It clearly improves the quality of the images and reduces the dose of the examinations.

There is less noise, even at low dose, with preserved or improved



M. Thomas Solot, CT Lead CT Technologist at the Sainte Elisabeth Clinic in Namur, Belgium.



Dr. Peter Verbeek, (new) Head of Radiology Department at the Sainte Elisabeth Clinic in Namur, Belgium.



Dr Sergio Pestieau, MSK Radiologist at the Sainte Elisabeth Clinic in Namur, Belgium.



image quality. This brings us more diagnostic confidence.

How does AiCE improve the image quality?

As a denoiser, the algorithms used improve contrast resolution and image quality. Without dose optimization, image quality is excellent. If you optimize the radiation dose, the quality remains very good, but allows us to scan effectively with low dose. After a few months of use, the average dose of the examinations decreased by 46% with

possibilities for optimization, with an maximum dose reduction of 80% in cardiac imaging. In ideal rhythm and patient conditions the dose can drop under DLP under 40 mGy.cm!

How was adoption of AiCE with your staff?

It is an ongoing learning and evaluation process. They have adapted to the new procedures and learned how to optimize parameters and appreciate the improvements in images compared to our old scanners.

What are the advantages of using high resolution images acquired with the Aquilion Precision?

We have already been able to acquire detailed studies of bone structures, small vascular anomalies, particularly neurological ones (for Arteriovenous Malformation (AVM), aneurysms etc.), the sinuses, and the fine structures of the temporal bone. Stent imaging for coronary arteries and other small vessels is now better. With these high-quality imaging capabilities,



Dr Hélène Antoine, Neuro – ORL Radiologist at the Sainte Elisabeth Clinic in Namur, Belgium.



Dr Marie Gheur, Thoraco abdominal Radiologist at the Sainte Elisabeth Clinic in Namur, Belgium.



M. Didier Vandeput, Chief Technologist of the Medical Imaging Department at the Sainte Elisabeth Clinic in Namur, Belgium.



we hope to improve surgical tumor extension assessments, especially for pancreatic and lung cancer.

Cone Beam CT (CBCT) also offers high-resolution imaging. How do you compare the two technologies?

Our CBCT is mainly used for high resolution at low dose for examinations of maxillofacial, dental and ENT (for sinus and temporal bone) pathology, and bone structures of the extremities.

It allows resolution from 150 to 75 microns. The lower contrast resolution does not allow the study of the soft tissue.

With the Aquilion Precision we are able to image bone structures at high resolution with a dose that begins to compete with CBCT with soft tissue contrast.

For example, the CT Dose Index (CTDI) for temporal bone CBCT is 21 mGy and

we have developed a protocol with the Aquilion Precision at a dose of 30 mGy with the same spatial resolution of 150 microns.

For what clinical indications do you use the spectral technology from Canon Medical Systems?

Oncologic patients, emergency mostly ischemic and hemorrhagic situations, characterization of renal lesion especially atypical cystic lesions and urinary stone characterization. It also gives us better depiction of contrast extravasation for EVAR-TEVAR follow up.

How does spectral analysis contribute to better diagnosis in clinical practice?

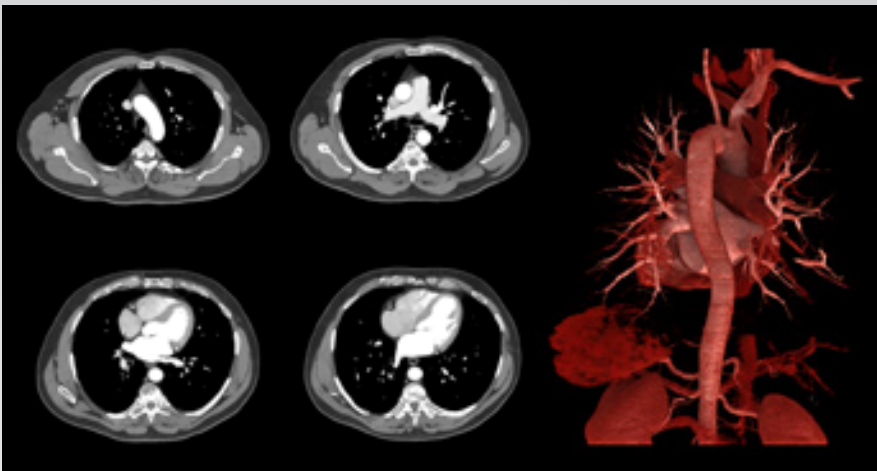
We can avoid irradiation from non-contrast acquisition, reduce the amount of iodine contrast media required and combine arterial and portal enhancement at different kVps.

It provides better depiction of contrast uptake, or absence of it, in cases of pathology (for oncology or ischemia).

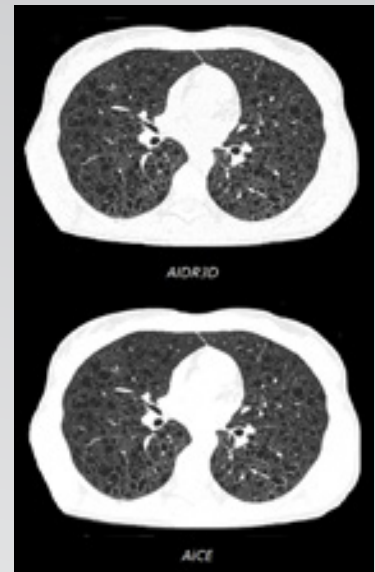
How would you describe your collaboration with Canon Medical Systems?

From start to finish, the support from Canon Medical has always been very professional, whether it was for the room construction and fitting-out teams, the device assembly team, or the engineers for the maintenance of the machines. The involvement and commitment of Canon's Managers was also appreciated. We continue to work closely with Canon Medical's Belgian and European Application staff to improve examinations and post-processing. //

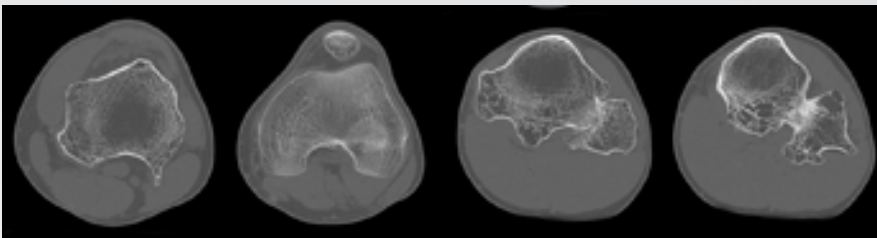
Clinical images from the Sainte Elisabeth Clinic, Namur, Belgium.



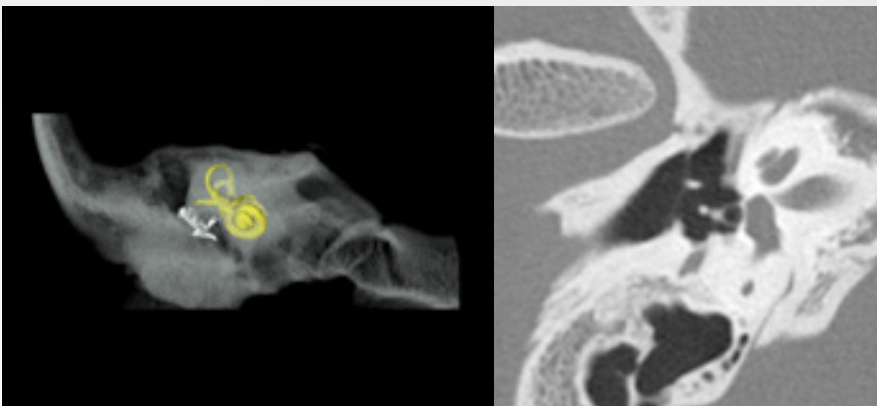
A gated Cardiac & Aorta scanned on the Aquilion ONE / PRISM Edition.



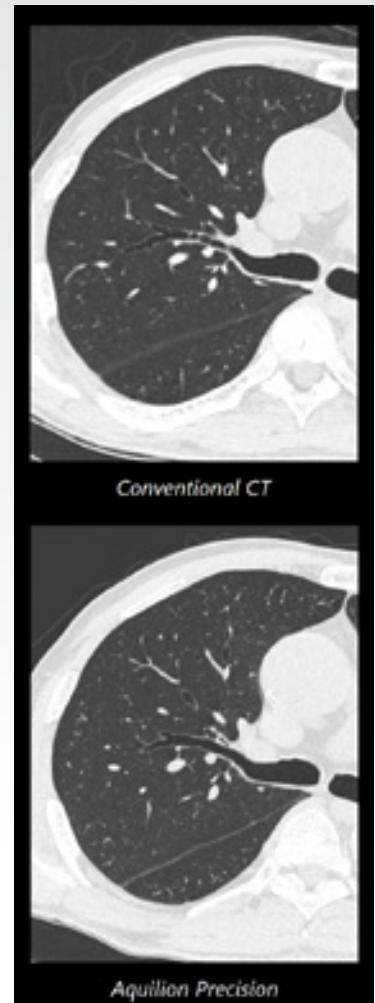
Comparison of Hybrid Iterative Reconstruction and AiCE using Aquilion ONE / PRISM Edition.



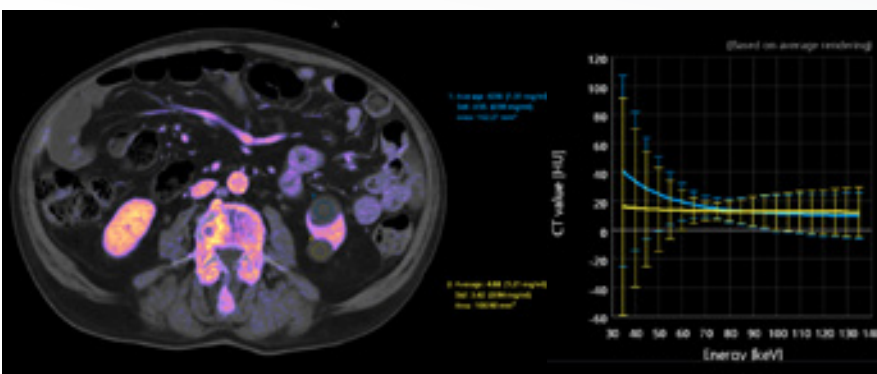
A Ultra High Resolution scan of the knee performed on Aquilion Precision.



The fine structures in the inner ear visualized with the Aquilion Precision.



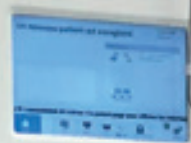
Comparison between conventional CT and Ultra High Resolution CT.



Analysis of kidney lesions using the Spectral Curves on Aquilion ONE / PRISM Edition.

Vantage Orian

Canon



VISIONS spoke with Matthieu Butavant (Radiographer at IRM 39 Nord, Dole, France) about his experiences with the Vantage Orian 1.5T.

A Seamless Transition that Boosts Productivity

Matthieu Butavant is a Radiographer with IRM 39 Nord, a radiology center based in the town of Dole, in France. Last Summer, the center installed a next-generation 1.5T MRI, Vantage Orian, which comes equipped with Canon Medical's Advanced intelligent Clear-IQ Engine (AiCE). We spoke to Butavant about his experience with this new MRI and his relationship with Canon Medical.

Can you tell us a little about the center and the work you do?

I am the referring radiographer at IRM 39 Nord, which is a public/private radiology center located in Dole, France. It is shared between the Dole Hospital and the private group, IM2P, which is based in the East of France.

We carry out a broad spectrum of medical imaging for Neurology, MSK, Cardiology, Oncology and so on. We work with both outpatients and inpatients at Dole Hospital. We opened the center in 2007.

Could you describe the Vantage Orian?

We work with the Vantage Orian. It comes equipped with AiCE, an artificial intelligence reconstruction algorithm, as well as all the productivity boosting technology, including Compressed SPEEDER as well as k-t SPEEDER for cardiology.

We have all the standard coils (neurovascular, body, breast and spine), and we chose 16ch Flex SPEEDER coils for MSK scans.

What initiated the recent change in supplier?

Since opening the center, we worked with the same image equipment manufacturer for the 14 years. We had a close partnership with them, and we were even a visitor center for other specialists to see their systems. However, we needed a breath of fresh air. We felt that we had to shake things up. All manufacturers responded to the call for tenders that we put out. Canon Medical's response was very impressive, and we were immediately interested, especially technically, from an operator's perspective. Most impressive was the reduced acoustic noise and the availability of Deep learning reconstruction with AiCE which no one could offer.

How would you rate the support that you have received?

We received pre-training during the installation works, which involved an application specialist giving us on-site training using a simulator. They also provided us with a lot of training materials ahead of time, which meant that we were familiar with the system even before it was delivered.

After that, the first patient was scheduled and we had two weeks of training during our clinical routine at a reduced activity to give us more time to learn. We then had a third week, following which we were back to our normal throughput of 40-45 patients a day. We are in touch with our Canon Medical Application Specialist all the time, and we regularly talk to her about how we can improve sequences and protocols.

How do you rate the image quality of your system compared to the old one?

Honestly, it's on a completely different level! What's impressive is how it brings together image quality and scan time. It can produce very fast images but with better image quality compared to what we had before. We already realized this when we performed a site visit, and this was the reason why Canon Medical was at the top of our list. But everyone knows that what you're shown during a demo doesn't always reflect how it will perform in practice. However, this time, we were very satisfied. It's a real improvement across the board, particularly in MSK scans, where the technology is excellent. We have increased through-plane resolution by 30% to enhance radiologists confidence. We're now going even thinner, with higher resolution, which makes the operator's job easier.

On top of that, we've integrated a lot of 3D imaging, specially for brain and spine studies. We were using 3D imaging before, but not with this image quality, and we've extended it to a range of other sequences.

Have you noticed an improvement in your workflow?

After two weeks with the system, we were able to get back up to our previous throughput of 40 patients per day. Now, we have accelerated up to 45-50 patients a day, even taking into account the new workflows opened up by this leap forward in examination quality. We're doing more of our most complex, time-consuming examinations, such as cardiology and abdomen, which we used to have some difficulty taking on. And all this despite the fact that we've had to get to grips with a whole new system.

“The Flex coils are super coils. It was the right call to get them, and I would recommend them to others.”

Matthieu Butavant, Radiographer at IRM 39 Nord, Dole, France.

What is your opinion on AiCE?

It was one of the main things that intrigued us with Canon Medical; we think it is very innovative. There really is a huge benefit to using AiCE.

We set up sequences with and without AiCE, and there really is no comparison.

AiCE gave us the possibility to substantially increase the overall image quality. This is a major advantage, and Canon Medical is the only one to offer it.

It's makes a big difference and is not just a gimmick. It is also a flexible tool that that can be adapted to your taste.

No doubt, the best thing about it is knowing that we've still not seen everything possible with this technology. We'll be rolling it out for cardiac imaging soon. As an operator, it's really exciting to refine the use this technology.

What is your opinion on Compressed SPEEDER?

We started to use Compressed SPEEDER for different anatomies and different imaging types. It allows us to perform a scan that normally take three minutes in just a minute and a half.

I'm now using it to get the most out of the system, with improvements in both examination time and image quality.

What is your opinion on 16ch Flex SPEEDER coils?

We thought long and hard about them, because we had exclusively used rigid coils up until that point. We considered it to be a bit of a gamble, especially in terms of workflow. We decided to go with these coils because we had been given guarantees about image quality, which results from the 16-element array. We felt they would be at least as good as the rigid coils.

With six months' hindsight, we have no regrets at all. It was definitely the right choice. It took the technologist a bit of getting used to, but it turns out that flex coils are very practical, very lightweight and the image quality is excellent. They're even faster to position than the rigid coils: Where I used to change the coils as per body part.

Now, I don't have to change them at all, I just use the same flex coil for different body regions. They're superb coils. It was the right call to get, and I would recommend them to others.

Has patient experience improved?

I think it's a very good set up. Obviously, the opening is wider than before, but it's the whole experience. The system is really bright, the bore is very short.

It also makes less acoustic noise, which is not only a plus for the patients, but for us as well. We don't get any complaints from our patients about it being too loud.



Canon Medical's Vantage Orian 1.5T at the IRM 39 Nord, France.

Another thing we can do is lower the table between patients, so they don't have to leap up onto the step.

What do you think are the other strengths of the system?

In general, it is obviously the short scan time combined with fantastic image quality, as well as the way it makes it easy to set up sequences.

On top of that, picking up how to use the console was fairly straightforward. It's absolutely intuitive, especially for those of us who still do filming and printing.

What three words would you use to describe Canon Medical?

Firstly, I'd say Family. It might seem 'over the top', but I sometimes feel like Canon Medical application specialist is my colleague at work.

I speak to her on the phone most days, I text her to ask for advice, and she always gets back to me very quickly.

“What's impressive is how it brings together image quality and acquisition time.”

Matthieu Butavant, Radiographer at IRM 39 Nord, Dole, France.

Next would be Responsiveness, because, as I've said, it was a big adjustment. Not only did we have the new system, but also a new manufacturer, and there were significant installation works to contend with. It all went well, right from the start, and I feel like you can really count on Canon Medical, even for the tiniest problem. People may say: "It can't be that perfect", but the main thing is the ability to manage a range of concerns and resolve them

very quickly. This is something that makes Canon Medical who they are today.

Lastly, I would pick Novelty or Inventiveness, because, as I see it, Canon Medical offers something that other suppliers just don't have right now. Whether it's AiCE or the very quiet MRI, thanks to Pianissimo, these are exclusive features that aren't just gimmicks and things that we actually use on a daily basis. //



Prof. Dr. Stefan M. Niehues, MHBA,
Senior physician in the department
of Radiology at Charité – University
Hospital in Berlin, Germany.

About Charité

Charité is one of the largest university hospitals in Europe. Charité extends over four campuses, and has close to 100 different Departments and Institutes, which make up a total of 17 different Charité Centers. Having marked its 300-year anniversary in 2010, Charité is now one of the largest employers in Berlin, employing 15,500 staff (or 18,700 if including its subsidiaries).

www.charite.de/en

How Deep Learning Reconstruction Became the Standard

About a year ago, we installed a wide area detector CT, the Aquilion ONE / PRISM Edition and the Advanced intelligent Clear-IQ Engine (AiCE) AI technology in our department. Adding the software to high-end CT equipment offers a fundamentally new possibility to reconstruct the images with superior image quality, great sharpness of detail and image contrast. Deep Learning Reconstruction (DLR) technology became standard practice on the very first day it was installed. The department now uses AiCE reconstruction whenever possible.

AiCE has guided us in a new era of image reconstruction that we don't want to miss

Initially, we had the option of using DLR either for further dose reduction or, alternatively, to increase image quality. Regarding dose reduction, we've always been very far ahead with Canon CT equipment. In the previous protocols, we've been well below the diagnostic reference values of the Federal Office for Radiation Protection. We made a conscious decision to use the new technology to achieve higher image quality.

Choosing this new workflow has proven extremely successful, and we now benefit from significantly increased image quality on a daily basis.

The decision to add the new software to the Aquilion ONE / PRISM Edition was also very much appreciated by the staff, who now prefer to have AiCE available on all CT equipment.

Switching from previous equipment to the Aquilion ONE / PRISM Edition CT with AiCE technology pleased everyone. They didn't have to refamiliarize themselves with the new system or relearn how to interpret the images.



The images are now much clearer and show a significantly increased signal-to-noise ratio (SNR), with a much better delineation of possible disease than with conventional CTs.

The noise in particular has once again significantly decreased, which facilitates better diagnosis.

Many of the Charité specialists share our enthusiasm. Cardiologists have reported that our department now delivers the best imaging results with high-tech CT compared to other radiological modalities, especially in cases where small structures are involved, e.g. revascularization of chronic coronary obstructions.

Our imaging is now considered the standard for planning recanalizations of chronic total coronary occlusions (CTO). We receive nothing but praise and great satisfaction from the cardiology department. In cardio diagnostics, volume CT is now absolutely prioritized.

“In daily practice, images are enhanced significantly. Choosing the Aquilion ONE / PRISM Edition was the right decision.”

Prof. Dr. Stefan M. Niehues, Senior physician in the department of Radiology at Charité – University Hospital in Berlin, Germany

Cardiac examinations have now reached a level that is difficult to improve today.

The necessary dose – less than 1 mSv for the Cardiac CTA - is consistently very low. Thanks to the short scan time and high temporal resolution, we can now directly examine the heart in volume CT, something we would have been hesitant about in the past - for example, in the case of a patient with arrhythmia and/or extremely high Agatson calcium scores (Case 2).

Reconstruction speed has also increased with the Aquilion ONE / PRISM Edition, but I hardly noticed the difference with previous Canon equipment, which already offered the possibility to completely reconstruct the images as soon as the patient left the room.

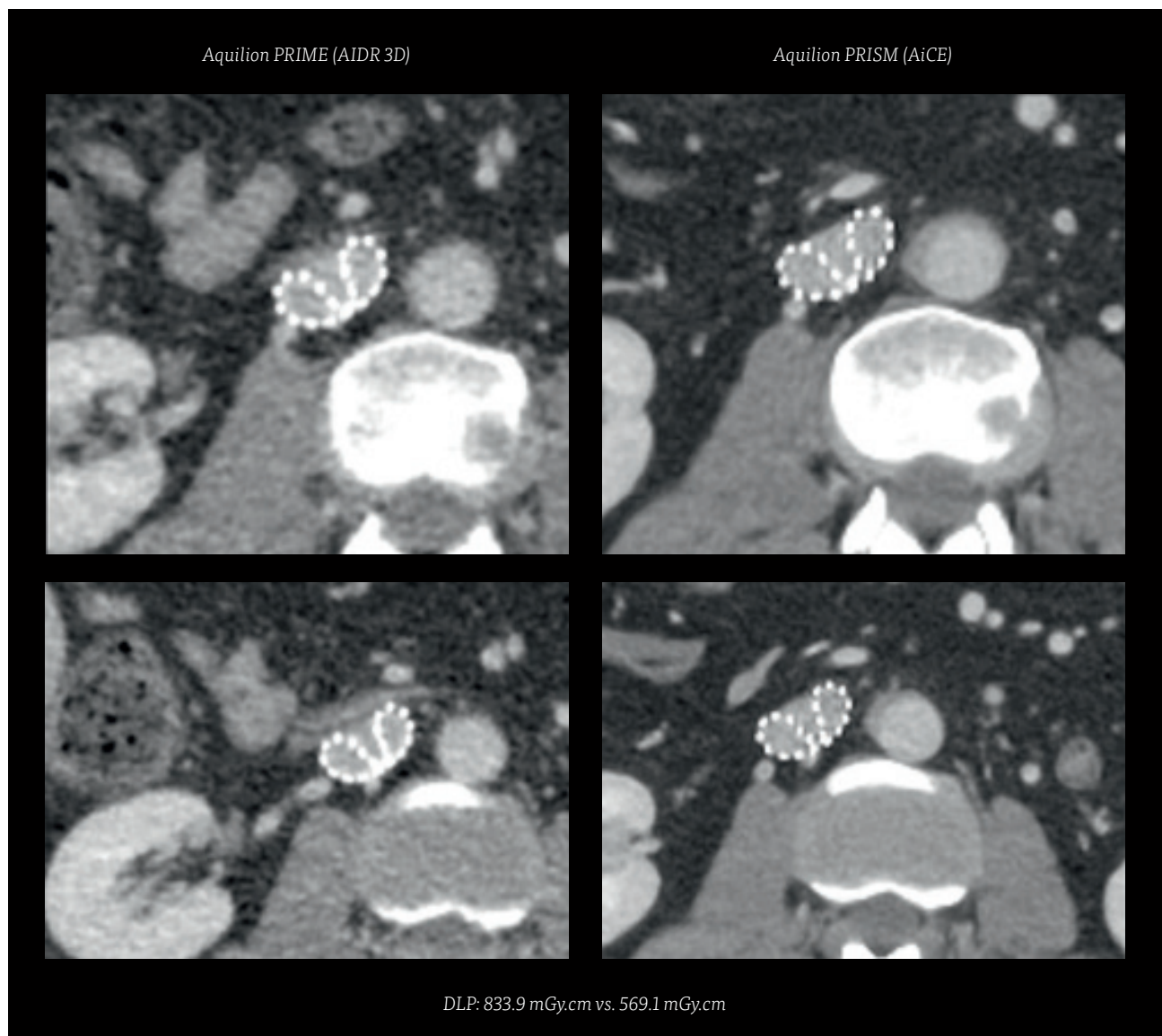
We never had a problem with reconstruction speed. It's never been a bottleneck in our workflow.

DLR technology provides extremely clear and distinct images, although

previous imaging with AIDR 3D on Canon CTs had quickly established itself and was long considered the highest technical level by the team. AiCE shows it can be even better. Inevitably, we would like to offer this high image quality to all our patients, and not only those who are examined with the latest system. //

Case 1:

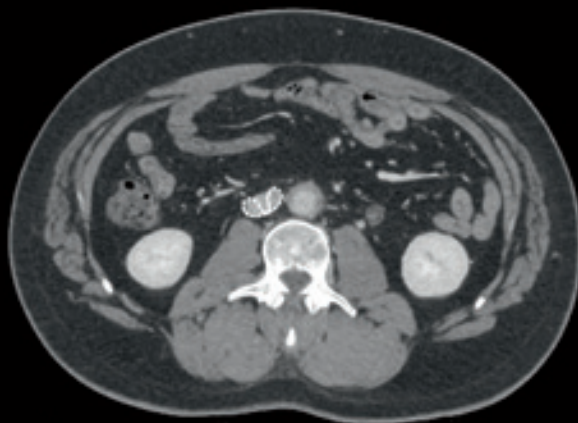
39-year-old patient undergoing venous stenting for post-thrombotic syndrome. Request vascular imaging for stent revision.



Aquilion PRIME (AIDR 3D)

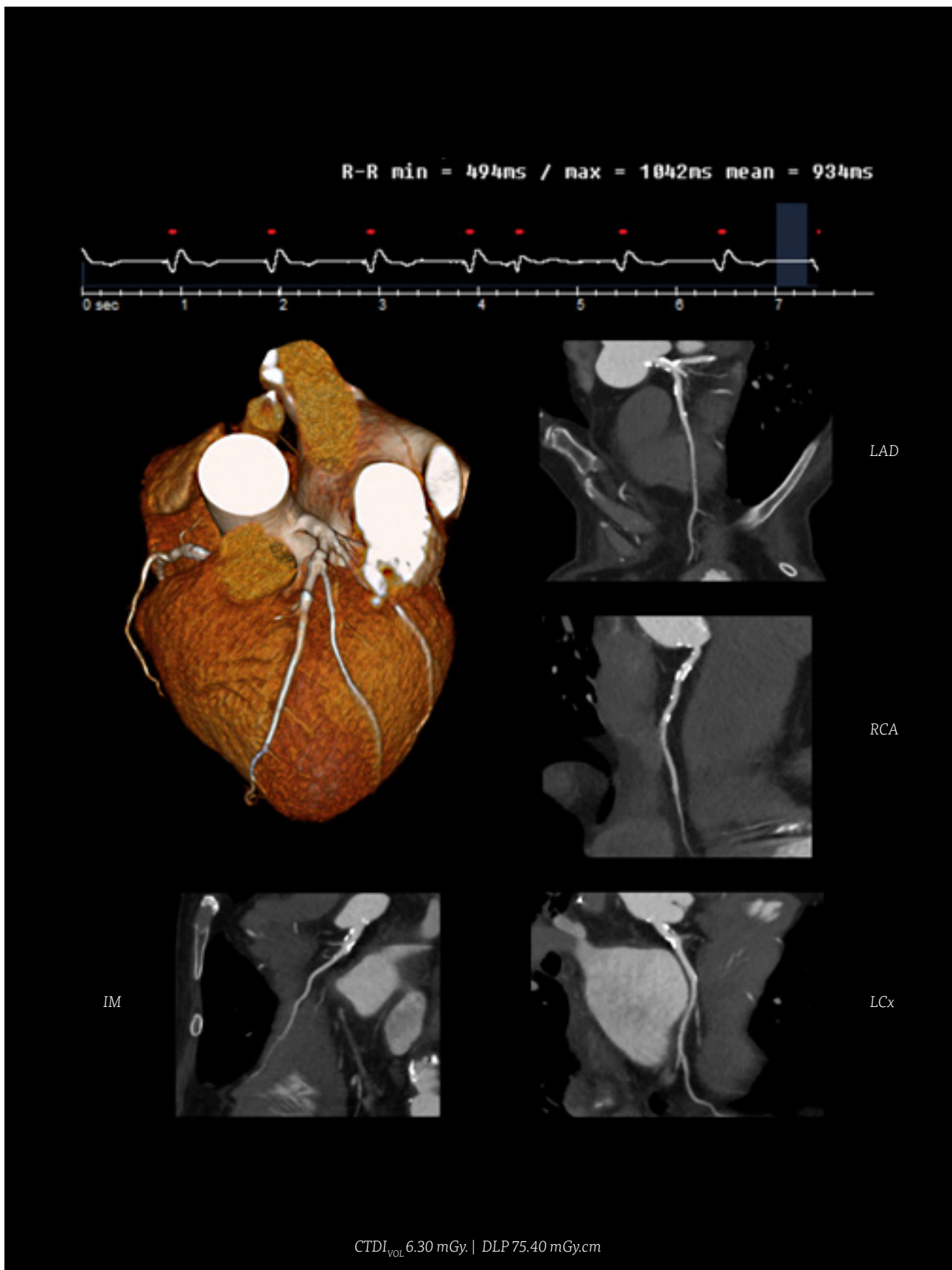


Aquilion PRISM (AiCE)



Case 2:

Cardiac CTA on a 82-year-old patient with arrhythmia and an Agatston score of 2392.





*Left: Adj. Professor Dr. Thomas Bayer, Head of General Radiology (Fürth Hospital, Germany).
Right: Professor Stephan Kloska, Head of Neuroradiology (Fürth Hospital, Germany)*



VISIONS spoke with Adj. Professor Dr. Thomas Bayer, Head of General Radiology, Professor Stephan Kloska, Head of Neuroradiology, and Stefanie Mattner, Chief Radiographer (Fürth Hospital, Germany).

Digital Efficiencies in the COVID-19 Pandemic

Since mid-2020, the Radiology Department at Fürth Hospital (Klinikum Fürth) in Germany, has been working with two fully digital Adora DRi systems and three mobile X-Ray units from Canon Medical. In this interview, Adj. Professor Dr. Thomas Bayer, Head of General Radiology, Professor Stephan Kloska, Head of Neuroradiology, and Stefanie Mattner, Chief Radiographer, discuss how the hospital has benefitted from the new systems, particularly during the COVID-19 pandemic.

Could you tell us a little about your hospital, specifically about the Radiology Department?

Dr. Bayer: Our hospital has more than 800 beds and the number continues to grow. Our X-Ray Department is used for the entire spectrum of procedures – acute, elective, out-patient and in-patient. Fürth Hospital has a large A&E department that is located right next door to the X-Ray Department. Due to this, our conventional X-Ray units are in constant use for emergencies, even during the night and at weekends. We cover the entire spectrum of acute care, both for neuroradiological and general radiological indications.

What demands does your department and its X-Ray systems face?

Prof. Kloska: We have a very busy A&E Department, and a large proportion of our patients have restricted mobility. In addition, we have staff limitations; on some nights there is only one radiographer at work. This means that we need a system that enables patients to be positioned easily by one person alone. The functions of the Adora system – that requires no repositioning in Level 2 - are really helpful to us. In the first wave of the pandemic, about 50% of the COVID-19 cases in the region were treated at our hospital. During times of heaviest demand, we had up to 90 in-patients with COVID-19.

“The functionality of the Adora system, which does not require repositioning on the 2nd level, therefore suits us very well.”

Prof. Stephan Kloska, Head of Neuroradiology.



In that phase in particular, when the rush of patients with suspected COVID-19 was especially marked, and we needed to presort COVID-19 patients and suspected cases quickly. We were able to respond very fast in A&E using the Adora system.

You have fully re-equipped your department in the area of conventional X-Ray diagnostics. Was there a specific reason for the switch to a fully digital system?

Dr. Bayer: Switching completely to a fully digital system was the only conceivable option for us. Nowadays, you simply can't get by anymore without robot-based X-Rays.

Prof. Kloska: Essentially, it would be true to say that switching to a fully digital system had been under consideration for quite a while. However, the pandemic was another factor that significantly accelerated the procurement.

Your bucky rooms were replaced by two Adora DRi systems. Are you happy with the new systems? What are their particular benefits?

Dr. Bayer: With the Adora system, we can adjust the imaging angle precisely whenever we need to, without having to reposition the patient – for axial images of both hip joints, for example. Effortless

work processes, a well-thought-out, menu-driven system and fully automated positioning are a great help to our radiographers. The system can be operated remotely, without needing to get right up close to the patient. Particularly during the COVID-19 pandemic, with all the isolation processes and hygiene regulations that have to be observed, the fact that the system can be operated remotely is an important plus point.

Prof. Kloska: ... and we can work much more economically than with the old imaging plate system that we used to use.



“There is simply no getting around robot-based X-rays these days.”

Dr. Thomas Bayer, Head of General Radiology.



59-year-old male patient with periprosthetic fracture after hip replacement; Fig. left: image of the thigh using the stitching technique for preoperative planning, Fig. right: Post-OP documentation.

The mobile X-Ray on the wards was also converted. Could you tell us about this experience?

Prof. Kloska: The mobile devices have significantly improved handling and workflows. The old system was working right at its limits. In the COVID-19 areas in particular, a lot of our activity is mobile, because then the staff only need to get changed once. With the old system we needed one cassette per patient that we had to read. Now we are spared all the bother of switching cassettes, and with worklists available wirelessly, we can also assign data direct to the individual patients.

Dr. Bayer: With the motorized units, we can move quickly around the hospital. And they fit into the lifts without any trouble, that's an important argument. It means we can quickly pick up on the individual jobs from the wards and process them. To ensure that there's no

inflation in the use of mobile X-Rays, our radiographers now carry out one 'X-Ray round' for elective COVID-19 X-Ray cases in the morning, and one in the afternoon.

Has this changed the workload for the staff?

Stefanie Mattner: Fundamentally, it's a great benefit for us that with the Adora system we can spontaneously switch between beds and mobile operation. The logistical work involved has reduced significantly with the use of mobile devices on the wards. Instead of the cassettes, all we need to carry around now is a detector – it makes the handling process much simpler for our team. Alongside this, we can move the patients around quickly and under complete automation, which makes repositioning them, especially with obese patients, very much easier. And, of course, it's much more convenient for the patients themselves.

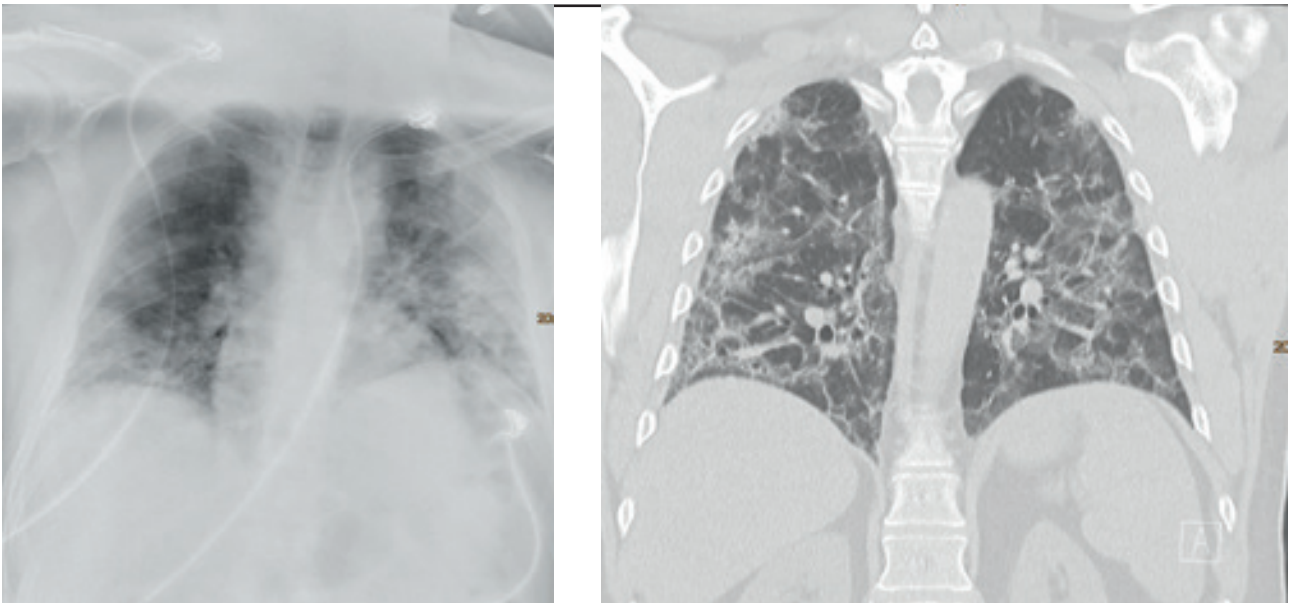
How satisfied are you with the image quality and the reduced exposure to radiation?

Dr. Bayer: With a robotic system, you can get a perfect angle from the radiation source to the detector. That makes it a lot easier to get the ideal image quality at a much-reduced dosage.

Prof. Kloska: This all depends on the settings, of course, we needed to make some subsequent adjustments there. We changed the positioning and adjusted the measuring chambers, and the radiographers had to change their procedures somewhat. In the end we got the settings for the Canon Medical image processing to the point where the image and the dose reduction met our high expectations.

You work with special flat detectors. What particular characteristics do these have?

Dr. Bayer: The flat detectors are easy to operate and are self-explanatory.



65-year-old male patient; Fig. left: emergency chest x-ray lying down if COVID-19 pneumonia is suspected, Fig. right: CT confirmation of the COVID-19 pneumonia on the same day.

Prof. Kloska: We've also had feedback from our radiographers that the flat detectors are not much heavier than the previous X-Ray cassettes. For daily handling, that's crucial, of course.

Stefanie Mattner: ... and with the recessed grips on the back, transporting them around is better. The risk of dropping them is significantly lower. Cleaning the flat detectors is uncomplicated, too, because they are very resistant to water. And let's not forget detector-sharing: We have a total of six Canon Medical flat detectors of two different sizes in use in the hospital and they can all be used interchangeably with all Canon Medical systems, which provides great flexibility and increases reliability.

How was introducing the new system under the more complicated conditions of the COVID-19 pandemic?

Dr. Bayer: That worked out successfully despite the exceptional situation. Canon has behaved in an exemplary manner. //

Fürth Hospital:

- Fürth Hospital (Klinikum Fürth), Germany, is the teaching hospital for the Friedrich-Alexander University of Erlangen-Nürnberg.
- It employs a staff of 2500.
- It cares for approximately 58,000 out-patients and 42,000 in-patients a year.
- The hospital specializes in Interventional Radiology and Neuroradiology. It performs all of the common, minimally invasive, radiological- and neuroradiological procedures.



Stefanie Mattner, Chief Radiographer (Fürth Hospital, Germany).

Maximum Efficiency, Prioritized Patient Safety and Increased Revenue with Canon Medical's 4D CT Technology

Osman Ahmed, MD
Section of Vascular and Interventional Radiology
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Yiemeng Hoi, PhD, Dale Marek, RT(R),
Mark Hohn, Andrew Kuhls-Gilcrist, PhD, DABR
Medical Affairs, Interventional X-ray Canon Medical Systems USA, Inc.

Real visionary innovation creates technology that improves efficiency, increases diagnostic and interventional revenue, expands radiology services and simultaneously delivers high-quality care while maximizing patient safety. Canon Medical's hybrid 4D CT system combines two powerful imaging modalities in the same room, allowing CT examinations and image-guided interventions without moving your patient to another department. This innovative solution may help you to support the expansion of complex interventional procedures, reduce treatment time, while improving throughput of other diagnostic imaging suites. Additionally, during an outbreak of communicable disease, having a hybrid 4D CT system reduces the need to transfer patients, thereby minimizing risk of exposure to both staff and patients.

Integrated Modalities Boost Efficiencies

Mixing CT guided interventions in shared CT rooms performing both diagnostic and interventional procedures can create inefficiencies associated with scheduling and patient transfers. In a 3-year study a reduction in interventional procedures from 5% to 2% in the shared CT rooms increased the CT throughput and resulted in 52% more diagnostic CT scans, or an addition of 391 cases per month (Figure 1). Increased CT throughput increases imaging revenue, creates more flexibility in patient scheduling, and results in an overall better patient experience. As the 4D CT suite is fully capable of supporting all image-guided interventions, it may also help to ease staff scheduling and increases productivity by reducing the need to have the medical teams juggle their time between multiple rooms

Improved Operational Efficiency

Comparing the first year case volume with the 4D CT system operational to the case volume 24-months prior, the number of interventional procedures grew to an average of 109 cases per month, equivalent to a 25% increase in interventional volume, excluding the transition period (Figure 2).¹ As the 4D CT suite promotes more complex procedures, it also

creates the opportunity for other conventional IR suites to optimize their efficiency.

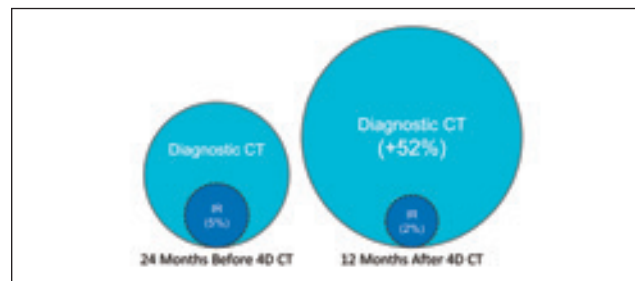


Figure 1 A significant increase in the number of diagnostic CT scans resulted when more interventional procedures were able to be allocated to a 4D CT system.

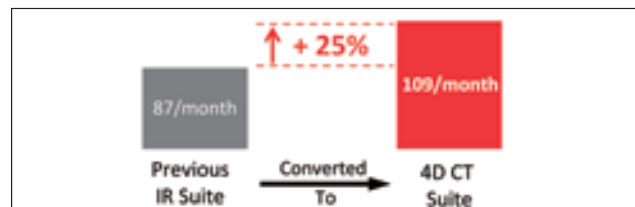
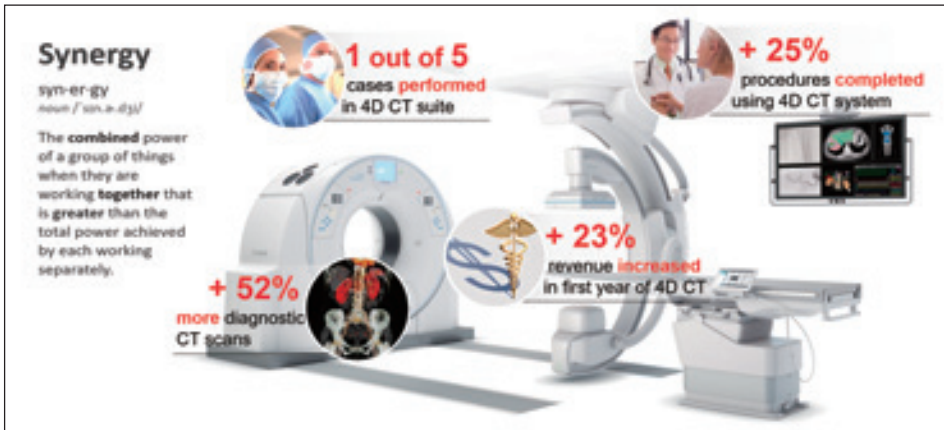


Figure 2 The 4D CT system reliably supported 25% more cases and consistently exceeded the average case volumes of the previous IR suite.

Increased Radiology Revenues

Increased procedure volumes can also translate into increased revenue. Evaluating five payor types (Medicare, Medicaid, commercial insurance, managed care programs and out-of-pocket), the total annual revenue increased 23% over the first year after implementation of the 4D CT (Figure 3) (See Appendix for analysis). The 4D CT suite expanded many new, diverse and/or high revenue interventional procedures supported by its innovative imaging technology. Including the increase in case volume in both diagnostic CT (+4692 cases/year) and 4D CT (+264 cases/year) suites and using the national average Medicare rates, the additional



Patient procedures were compared before and after the 4D CT installation over the study periods from March 2016 to February 2018 and March 2018 to February 2019, respectively. Several benefits were observed with implementation of a 4D CT, including increases in efficiencies and revenue.

annual payments can be estimated. For example, at the low end, an additional 4692 diagnostic chest CT scans (CPT 71250) and 264 lung biopsies (CPT 32405) would add an additional annual payment of approximately \$900,000. At the high end, assuming all CT scans were abdomen pelvis with contrast and all interventional procedures were transcatheter radioembolizations (CPT C 2616) would add approximately \$5.1M in annual revenue. Actual increases in revenue likely fall somewhere in between the minimum and maximum estimates.

Diversification of Services

Implementing 4D CT technology provided innovative capabilities and new synergies to tackle the most complex interventions (Figure 4). In addition to increasing complexity and diversity of procedures, there was an observable expansion in the number of cases and services provided.

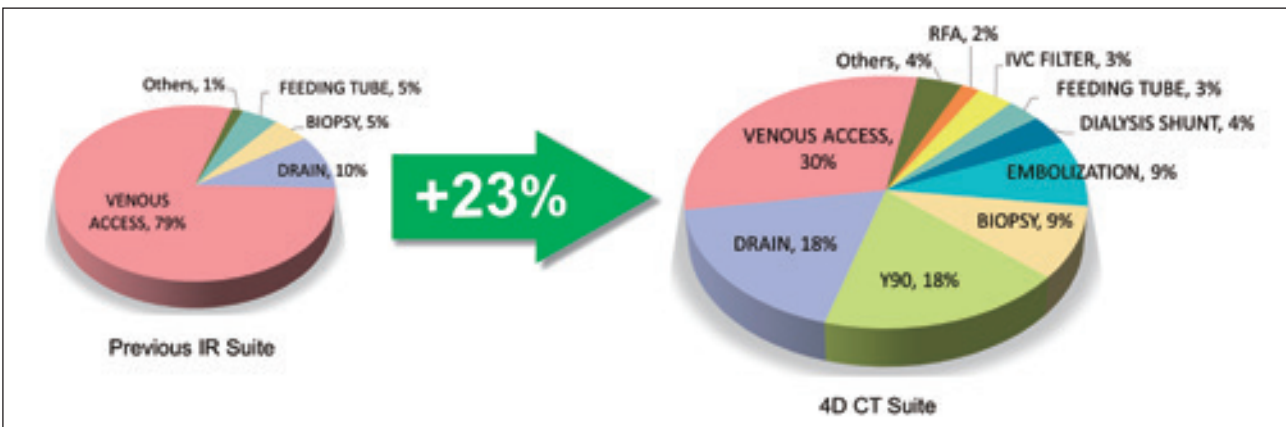


Figure 3 Modeling of revenue between the previous IR suite and the 4D CT IR suite during the study period estimated at least 23% increase in revenue was gained after installing the 4D CT system.

Prioritized Safety

Without the need to transfer a patient between diagnostic CT and interventional suites, the risk of transmission of or exposure to infectious diseases is minimized. Reducing patient transfer may also lessen transport accidents, diminish non-productive time between cases, and reduce the disinfection costs of treatment in multiple locations. Utilizing a negative pressure 4D CT suite also maintains an appropriate level of preparedness during acute outbreak of respiratory pandemic events.

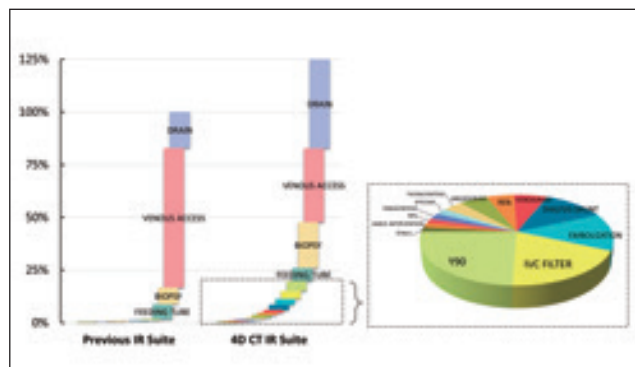


Figure 4 When compared to published literature, Canon's 4D CT delivers lowest total effective dose in TACE procedure.⁵

Enhanced Procedural Outcomes and Optimized Radiation Dose

An integrated CT and angiography system has been shown to not only increase sensitivity and specificity of hepatic and colorectal cancer diagnosis², but also supports low recurrence rate³ and significantly higher survival rate in liver cancer patients⁴. The 4D CT system was found to significantly decrease patient radiation dose during trans-arterial chemoembolization (TACE) procedures as compared to angiography systems that rely upon Cone-Beam CT (Figure 5)⁵, leading to a reduction in the risk of radiation injury to both patients and medical teams.

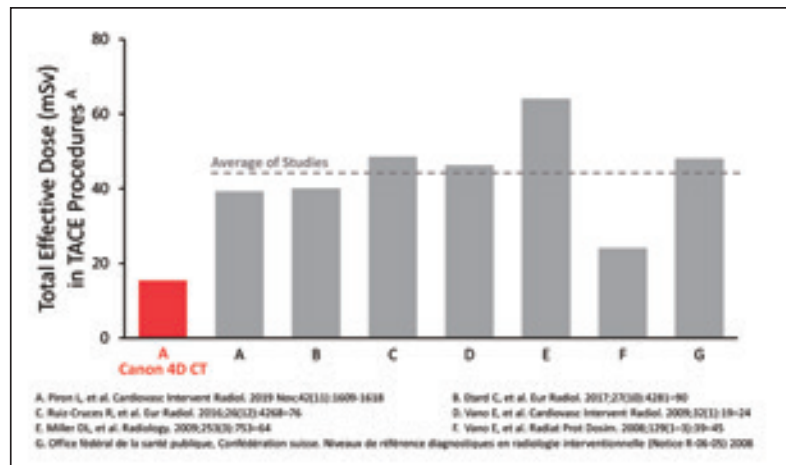


Figure 5 When compared to published literature, Canon's 4D CT delivers lowest total effective dose in TACE procedure.⁵

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Collaborate For Better Patient Care

Canon offers a multidimensional knowledge base, dynamic customer interaction, and a robust support system of training and education to help medical teams transition and prosper within the today's healthcare environment. Canon's onsite accredited training program, conducted by experienced Application Specialists, provides in-depth information and experience in multi-phases of high quality training, empowering the medical team to use the system to its fullest potential.

Conclusion

The seamless integration of Canon Medical's industry leading interventional system with best-in-class CT technology offers one versatile solution for all possible interventional needs. This innovative 4D CT system may help you to boost efficiencies, improve throughput and increase revenue of both diagnostic and interventional suites. In addition, it may also help you to maintain an appropriate level of preparedness during acute outbreak of respiratory pandemic events through minimizing risk of disease transmission and disturbances in workforce. Easily switching between CT and angiography systems in a single room setting eliminates the need to transfer the patient and medical teams between rooms, which may lessen transport accidents resulted from patient transfer, diminish nonproductive time between cases, and reduce the disinfection costs of treatment in multiple locations. In summary, Canon Medical's 4D CT enables you to improve your efficiency, increase diagnostic and interventional revenue, expand radiology services and simultaneously deliver high-quality care while maximizing patient safety.

Appendix

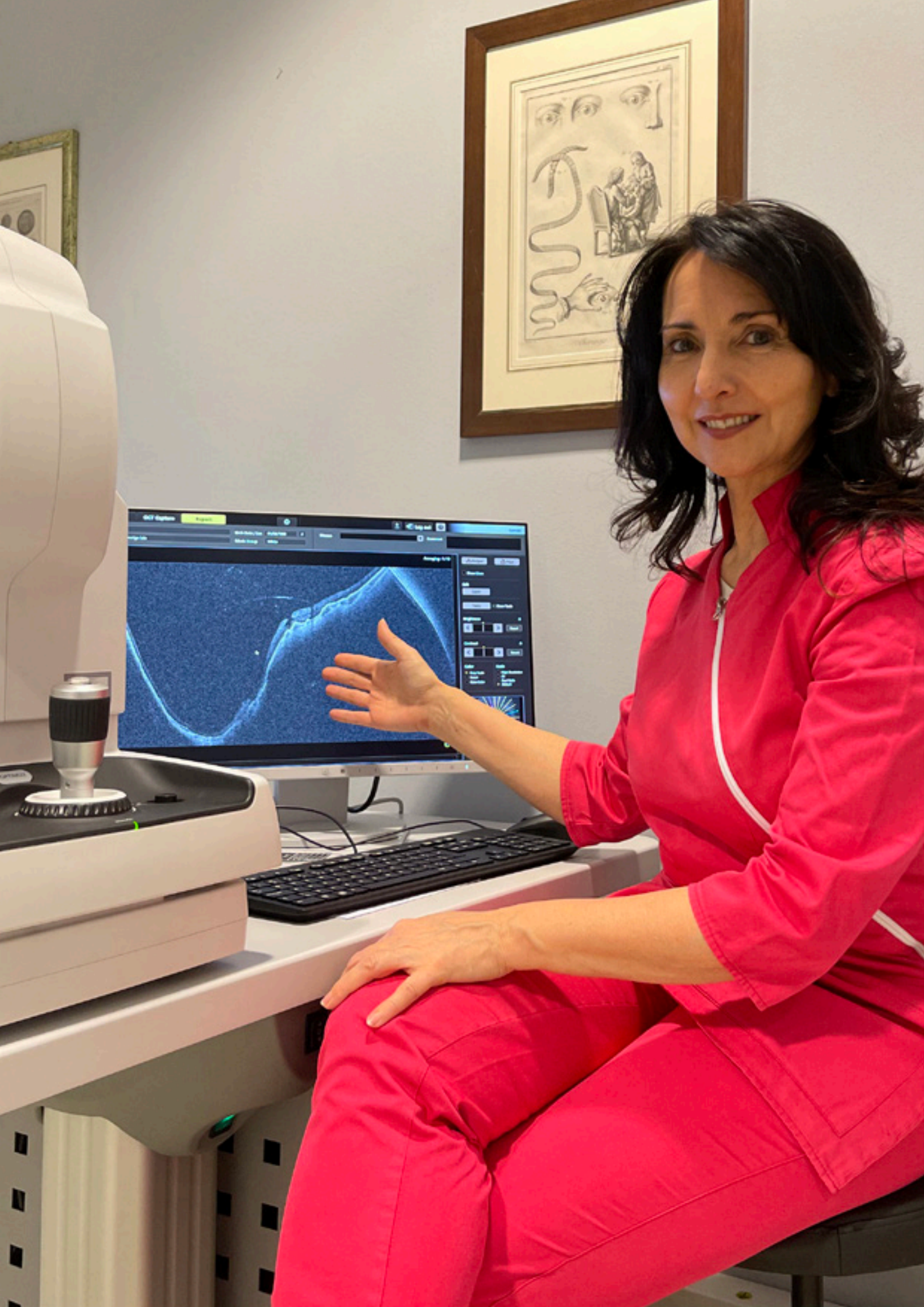
An evaluation of the total annual payments for the 4D CT suite and the previous IR suite over a study period of 36-months was performed looking at five payor types: Medicare, Medicaid, commercial insurance, managed care programs and out-of-pocket. The total annual revenue was estimated by multiplying the total payment from each payor to the national health expenditure payor mix ratio (20% Medicare, 17% Medicaid, 34% commercial insurance, 10% out-of-pocket and 19% managed care programs). Payor payments were calculated using national average Medicare rates, the Illinois Medicaid-to-Medicare fee ratio of 0.79⁶, and the commercial payments-to-Medicare fee ratio of 2.16.⁷ Out-of-pocket and managed care payments were considered equivalent to commercial insurance and Medicare rates, respectively. //

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The clinical results, performance and views described in this white paper are the experience of the author. Results may vary due to clinical setting, patient presentation and other factors. Many factors could cause the actual results and performance of Canon's product to be materially different from any of the aforementioned.

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VISIONS spoke with Dr. Barbara Parolini
(Head of the Vitreo Retinal Unit at the Eyecare
Clinic, Brescia, Italy) about Canon's Xephilio
OCT-S1 and OCT-A1 Eye Care systems.

Offering a Wealth of Unexplored Possibilities

Dr. Barbara Parolini is Head of the Vitreo Retinal Unit at the Eyecare Clinic, a private institution in Brescia, Northern Italy. In an interview with Visions, she explained how the Xephilio OCT-S1 and OCT-A1 enable her to better understand pathology, confirm suspected disease and follow up patients even remotely.

Welcome to Brescia, 'the Lioness of Italy', home of Italian caviar. This beautiful town, more discreet than its neighbor Verona, attracts sightseers looking for something new. Some travel a long way for the opportunity to materialize a vision: improve their eyesight.

Many of these visitors are patients of the Eyecare Clinic, where Dr. Parolini works with the finest Canon Medical equipment.

"I see about 30 patients per day. Most patients have been referred from all over the country and abroad for retinal pathologies, and peculiar cataract and refractive procedures," she said.

Dr. Parolini and her team provide full eye check, central nerve and macula OCT, ultrawide OCT, angio OCT and anterior segment OCT as well as central and wide retinography, autofluorescence, and, when needed, micropetry, corneal map, biometry and endothelial cell count.

To support their procedures with optimal imaging technology, Dr. Parolini and her three orthoptics colleagues use the Xephilio OCT-A1 and OCT-S1. The latter was installed in July 2020 and has become essential to daily practice.

"The challenge was to fit both machines into the routine workflow. That's why I have three technicians working with me now," she said.

“Working with the Xephilio OCT-S1 and OCT-A1 offers plenty of benefits, starting with a better understanding of the pathologies.”

Dr. Barbara Parolini.



“I want as much imaging as I can get for each patient. Imaging is essential for collecting precise information to reach a correct diagnosis during and after consultation. I study the most complicated cases even after the patient is gone and compare my images with published data. I also use images for educational purposes.”

Improving daily routine and bringing new opportunities

“Working with the Xephilio OCT-S1 and OCT-A1 offers plenty of benefits, starting with a better understanding of the pathologies,” she said. The equipment also helps confirm suspected pathology and follow up patients, both in the conventional and telemedicine setting.

Having to diagnose patients remotely is a frequent scenario, especially in the case of an emergency. “My orthoptists are such experts now that they scan the fundus with color wide field retinography and wide field OCT and send me the images in real time. So, I can decide which management to offer even when I’m not at the clinic. This is a real optimization of my work and a great plus for the clinic and the patients.”

The technology enables to see further than conventional techniques. Dr. Parolini recently diagnosed peripheral schisis and retinal detachments that were invisible using a contact lens,

with the patient sitting at the slit lamp, or wide field retinography. “I was astonished myself. Using wide-field OCT, I realize how much more we can see.”

Another key advantage brought by the Xephilio is the study of the retina in non-cooperative patients, such as children and patients with high photopsia. “The light of the OCT is much easier to endure for patients. And with the imaging of the OCT-S1, I have enough information to check almost every pathology on any patient. I can collect great images

full of details even in miosis, which is great for patients with shallow anterior chamber or suspect allergies and pregnant women.”

Canon’s high-end technology brings many improvements in daily routine, allowing higher resolution of images, wider scans, images superimposed on the retinography, faster angiography and enface OCT of the retina layer.

“The equipment provides new insights of the peripheral area of retina, vitreous and choroid,” she said.

Biography

Dr. Barbara Parolini was born on April 17th, 1968 in Italy. She underwent her postdoctoral fellowship in 1994-1995 at UCSF (San Francisco, USA) and in 1997-1998 at UMDNJ (Newark, USA).

She is Head of Vitreo Retinal Unit at Eyecare Clinic, in Brescia, Italy. She has treated 10,000 cases of complex cases of vitreoretinal pathologies in both adult and paediatric patients; submacular surgery; high myopia; cataract; glaucoma and refractive surgery.

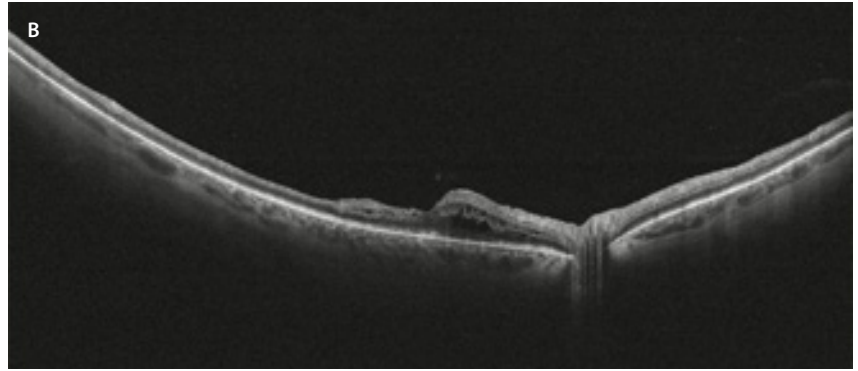
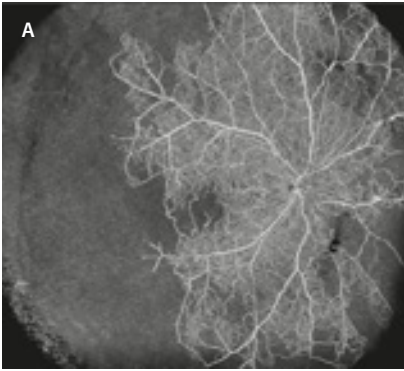
She has published 60 peer-reviewed papers and four book chapters.

She’s a tutor of the Bremen Vitreo Retinal School and the Thessaloniki Vitreo Retinal School.

She’s regularly invited as speaker and moderator, and to perform live surgery all around the world.

She’s a reviewer for multiple peer-reviewed journals and Vice President of the European Vitreoretinal Society (EVRS).

www.retinitaly.net is an educational website for patients and doctors with videos



Central retinal vein occlusion

A) AngioOCT of the superficial capillary plexus with Canon S1. Absence of blood flow in the temporal inferior and nasal quadrants

B) OCT Bscan. Thinning of the temporal retina and macular edema of the nasal macula.

As Vice President of the European Vitreoretinal Society (EVRS), a professional independent initiative, Dr. Parolini is keen on sharing knowledge and detecting new trends in medical retina surgery and imaging.

She expects the OCT-S1 and OCT-A1 to push wide field angiography so that it can replace fluorescent angiography whenever possible. Angiography of the choroid will also advance in the future thanks to the combined efforts of clinicians, researchers and the industry.

“Using wide-field OCT, I realize how much more we can see.”

Dr. Barbara Parolini

“The Xephilio will change patient management and enable to image every patient in the periphery of the retina with more precise diagnosis,” she said.

Working with Canon Medical Systems has proved a wonderful experience. “It’s been an extremely smooth, fast, and enthusiastic collaboration. I appreci-

ated the approach by the company and would love to undertake multicenter studies through the Canon network.”

A passionate educator and tutor for the European Vitreo Retinal schools in Bremen, Germany and Thessaloniki, Greece for many years, Dr. Parolini sees cooperation as an essential part of her work. “I always love comparing my way with the others’. I love to learn endlessly.” //

“The equipment provides new insights of the peripheral area of the retina, vitreous and choroid.”

Dr. Barbara Parolini



Deep Learning Reconstruction – a Game Changer in CT Imaging

Canon Medical's Advanced intelligent Clear-IQ Engine (AiCE) is the world's first deep-learning reconstruction software that produces high quality CT images with 'Patient dose up to 90% below UK National Diagnostic Reference Levels'. VISIONS spoke to Dr. Richard Hawkins, Consultant Radiologist at the Mid Cheshire Hospitals NHS Foundation Trust, UK, about its benefits in daily practice.

A Deep Learning Reconstruction Artificial Intelligence (AI) innovation, built into an Aquilion ONE / GENESIS Edition CT scanner is delivering a 'new era' of patient imaging at Mid Cheshire Hospitals NHS Foundation Trust, UK.

Patient dose reductions of up to 90% below National Diagnostic Reference Levels (NDRLs) have been achieved at Leighton Hospital in Crewe using the Advanced intelligent Clear-IQ Engine (AiCE), a Deep Learning Reconstruction AI algorithm integrated into its new Canon Medical CT scanner. The low doses have even been achieved when examining traditionally

difficult to image patients such as severely ill patients with their arms by their sides, patients unable to hold their breath and bariatric patients.

"Advanced Deep Learning Reconstruction of clinical images using AiCE heralds a new era in CT. It enables phenomenal patient dose reduction, up to 90% below the National Diagnostic Reference Levels, at the same time as providing extremely high-quality clinical images and all in a rapid timeframe suitable for everyday clinical use. This goes far beyond model-based iterative reconstruction on CT and as Canon Medical was first to innovate

in this area, it offers the most mature system of this kind," states Dr. Richard Hawkins, Consultant Radiologist at Mid Cheshire Hospitals NHS Foundation Trust.

He continues, "The clinical images generated using AiCE are much more natural and acceptable in appearance to radiologists reporting on cases. Previously, with model-based iterative reconstruction, the images looked as if they had been painted with water-colours. This is a great improvement – once you see them you'll never look back. As a department we have always been very proactive when it comes to keeping patient dose down and our



"It enables phenomenal patient dose reduction, up to 90% below the National Diagnostic Reference Levels."

*Dr. Richard Hawkins,
Consultant Radiologist,
Mid Cheshire Hospitals NHS Foundation Trust,
United Kingdom.*



experiences of using the system every day for inpatients and outpatients has exceeded our expectations. AiCE is a game changer for radiology.”

“Advancements in Artificial Intelligence to further the capacity and capabilities of radiology are very exciting. It isn’t theory or pilot studies, it is real and being used in the UK by busy NHS hospitals to power the improvement in patient care, speed-up processes and empower clinical confidence,” states Mark Thomas, CT Modality Manager at Canon Medical. “AiCE is trained using a deep learning algorithm to differentiate ‘noise’ from true signal, reducing distortions, preserving edges and maintaining details in image outputs at the same time as achieving lower doses than ever seen before in routine CT imaging.” //

Leighton Hospital, part of Mid Cheshire Hospitals NHS Foundation Trust, UK, is one of the first NHS hospitals using Advanced intelligent Clear-IQ Engine (AiCE), a Deep Learning Reconstruction AI algorithm on its Aquilion ONE / GENESIS Edition CT scanner.

Pictured L to R: (Rear) Tamzin Culverhouse, Medical Imaging Assistant; Alex Finnie, Senior Radiographer; Matt Simpson, Consultant Radiologist; Barnaby Harrison, Account Manager at Canon Medical Systems UK. (Front) Justin Edwards, Advanced Radiographer Practitioner; Sophie Vaux, Senior Radiographer; Dr. Richard Hawkins, Consultant Radiologist; and Mark Thompson, Medical Imaging Assistant.

[Picture taken pre-COVID-19]

Interested in the scientific paper: **‘The future of CT: deep learning reconstruction’** by C.M. McLeavy, M.H. Chunara, R.J. Gravell, A. Rauf, A. Cushnie, C. Staley Talbot, and R.M. Hawkins?



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How Hygienic Positioning Aids are Simplifying Work Processes during the Pandemic

Extraordinary times demand extraordinary special measures. It is no accident, therefore, that Canon Medical Systems Europe entered into a partnership with Pearl Technology AG early in 2019 to make sustained improvements to important aspects of hygiene in their positioning aids – no accident, but rather a mix of fortunate coincidence and wise forethought. And then suddenly, along came COVID-19 and speed was of the essence!

Since the start of COVID-19 and even before then, hygiene has been vitally important in protecting colleagues and patients in the field of medical radiology. Radiology is different from almost any other hospital department in terms of daily visitor numbers, with very large numbers of both in-patients and out-patients attending. This fact presents enormous challenges for the specialist medical staff, and the tools and aids used are under a great deal of pressure in the effort to ensure ideal hygienic standards at all times. With up to 80 patients passing through a CT scanner on any given day, the intervals available for appropriate cleaning and disinfection are very short indeed. On top of that, the sheer number of cleaning procedures and the ever more aggressive disinfectants place the surfaces of the tools and aids under a massive strain. To make matters even worse, the nature of some of the commonly

available positioning aids is simply not compatible with economical and hygienic working practices.

Conscious of all of this, back in January 2019, the CT team at Canon Medical made a plan with Pearl Technology AG to work together, with the close involvement of customers and users, to set new standards in the area of patient positioning and with a particular focus on hygiene. After more than ten years in this market, Pearl Technology AG has become a leading provider in Europe for patient positioning equipment in radiology. Using high quality materials and a range of technologies, it covers the entire spectrum with products that can withstand the demands of modern and highly maybe “busy” radiology departments. Today, Pearl Technology’s product range comprises six product lines including, for example, the PearlFit positioning aids for MR, CT and other fields.

“We no longer have to make compromises between secure patient positioning and the hygiene guidelines.”

*Dr. Sascha Alexander Pietruschka,
Head Physician at the Dietrich-Bonhoeffer Klinikum
(Clinic for Radiology and Neuroradiology), Germany*



In an initial stage, several expert interviews were conducted. These confirmed very clearly that with existing positioning aids, the issues of hygiene and patient safety were in urgent need of sustained improvement.

Dr. Sascha Alexander Pietruschka, Head Physician at the Dietrich-Bonhoeffer Klinikum (Clinic for Radiology and Neuroradiology) in Germany, commented: “Hygiene is of particular importance in patient examinations. Even in the past, the fact that we were dealing with multi-resistant pathogens made it necessary

to stick closely to guidelines on hygiene. Regrettably, with the tools and aids generally supplied by the manufacturers, this was and is impossible. The belts that are necessary to ensure that patients are securely positioned were made of fabric, with hook and loop fasteners. It is impossible to prevent contamination of these fabric belts and then to return them before re-use to a condition in which it can be determined that pathogen thresholds are not exceeded. Given that we have 10-15 minutes between examinations and that the necessary disinfection of the belts by immersion and drying takes 24 hours, you would

need to keep a stock of 40 belts in a department such as mine, and having your own logistics for preparing the belts would be a must.” In addition to this, it rapidly became clear that a perfectly fitted cover for the table mattresses was required, with wings to prevent fluids passing from the table onto the base and with material properties to prevent it from getting caught as the table passed through the gantry.

Once CT belts and mattress protectors had been identified by customers as the top priority, Pearl Technology AG immediately launched into development of the first prototypes. In consultation with Daniel Barion, CT Product Manager for Germany, these were distributed to key customers back in March 2019 for testing in their daily routine. The improvements and design adjustments that emerged from this testing were discussed with a number of experienced, knowledgeable, application specialists at Canon Medical. Allowing the enormous technical knowledge gained from decades of application experience at Canon to be brought together. In addition, direct dialogue was sought with other Canon customers during the German user meeting in Berlin in November 2019, and this was used for an intensive exchange of thoughts and ideas.



Immobilisation of the head during a CT perfusion scan using the inflatable CT HeadFix.



Arms-over-head positioning for thoracic/abdominal examination using ProBelt on the Aquilion Lightning.

To conclude this process, revised prototypes were being used by customers for 'real life stress-testing' by the end of 2019; these fully lived up to requirements in terms of hygiene, handling and durability, while the materials selected ensured that they did not affect image quality in any way.

Then, in January 2020, the world began to turn upside down and by March 2020, it was obvious to everyone in Europe that COVID-19 would change everyday life, including life at the radiology departments. At the early stages, computerised tomography came sharply into focus for the diagnosis and therapeutic monitoring of COVID-19 patients. Exceptionally strict disinfection processes (some involving 70% alcohol), long 'blocking periods' (up to 90 minutes in cases where COVID was suspected) and more explicit zero tolerance with regard to cleanliness and hygiene all pushed the equipment and staff to their limits.

Thanks to this timely collaboration, as COVID-19 reached its peak all that was needed was to turbocharge regulatory approval and production. The instructions for use included with the products, for example, were translated into some 20 languages and approved in a very short space of time, to ensure that customers in all the countries from Portugal to Georgia had access to the newly developed solutions. In early September 2020, the first of the ProBelt and CT Table Covers were delivered to customers.

"Within eighteen months, we had gone from a product idea to the Europe-wide launch of the products. For medical devices – even if only in Class 1 – that is something like the speed of light. This was only possible thanks to our years of specific experience in patient positioning as well as the huge support of and reliable collaboration with Canon. Direct access to Canon users during development and very detailed feedback about the daily routine allowed us to develop

a very high quality and tailor-made product incredibly quickly. So the 'voice of the customer' was ever-present," said Dr. Thomas Müller, co-founder and General Manager of Pearl Technology AG, reflecting on the development work.

The ProBelts and CT Table Covers, like all products from Pearl Technology AG, are made from polyurethane film, which allows regular wipe-down disinfection even with 90% alcohol without the surface of the material becoming brittle or porous.

The ProBelts allow the patient to be secured in a stable position using eyelets and hooks, without the use of hook and loop fasteners, and raise cleanliness and hygiene to a totally new level. All six of the CT Table Cover versions for the various CT tables were developed in colours matching the Canon CT units, making the close collaboration immediately visible and ensuring that for the customer, everything is visually from the same mould.

“Direct access to Canon's users allowed us to develop a very high quality and tailor-made product incredibly quickly.”

Dr. Thomas Müller, co-founder and General Manager of Pearl Technology AG, Switzerland.



Moreover, various features, such as the marking of the scan range and the breadth of the wings, are all matched to the characteristics of the individual CT tables.

In manufacturing the products, Pearl Technology AG meets the high quality requirements for medical devices and those of Canon Medical. From the point at which it leaves the factory, each product is individually subjected to a comprehensive quality control process to identify any weak points in the PU films or in the high frequency welded seams. All products are 100%

manufactured in Switzerland and in accordance with ISO 13485.

Close to twelve months have passed since the first delivery, and on more and more CT devices, Pearltec products are helping to simplify patient positioning in a way that guarantees ideally hygienic conditions. Across Europe, initial feedback has been thoroughly positive.

Dr. Sascha Pietruschka is delighted with the materials chosen and with their hygienic properties. “Through regular direct contact tests and microbiological analysis during validation of the ProBelt,

we were able to demonstrate that with commercially available disinfectants it was possible to return the equipment to an ideal hygienic condition for immediate re-use. By performing a wipe-down disinfection of the ProBelt at the same time as that of the CT Table Cover, we managed to reduce the germ load on the surfaces to the extent that thresholds were never exceeded. The ProBelt system solves the hygiene problem. It is made of easy to clean, hygienically ideal materials and it dries quickly. According to my team of radiographers or radiology technologists, handling and secure positioning are at least as good as with previous belts. We no longer have to make compromises between secure patient positioning and the hygiene guidelines.”

“It is fantastic to see how even in the complex world of medical devices a dynamic, constructive collaboration between two companies, alongside close dialogue with customers and users, can rapidly improve outcomes for patients and users with simple, innovative solutions. For everyone involved, of course, it makes sense to follow up on a success story such as this. So intensive work has already started on additional solutions in various different fields of application. We look to the future with excitement,” Dr. Pietruschka concluded. //



CT Table Cover, ProBelt and PearlFit positioning aids from Pearl Technology at the Aquilion Lightning.

General guidelines for authors

Works are generally classified into two categories: Full length articles (e.g. clinical added value of new/special applications & technologies) and Short contributions (e.g. system testimonials, case reports, technical notes).

All articles should be double-spaced.

Full length articles

Full length articles should generally include the following:

- Author's full name and highest academic degree, employer medical institution
- Author's biography (150 words)
- Author's passport-size photograph (suitable for publication); (image of 300 dpi)
- 200-word abstract
- Text including headline, sub-title, introduction and sections like: materials & methods (which should include a full description of equipment used), results, discussion and references
- Text approx 4 to 5 pages or 12.000 to 14.000 characters (not including figures, tables and photographs)
- Correspondence address
- Literature (no more than 10 references)
- Separate, continuous numbered image- and table captions

Short contributions

Short contributions should generally include the following:

- Author's full name and highest academic degree
- Author's employer medical institution
- Author's biography (150 words)
- Author's passport-size photograph (suitable for publication); (image of 300 dpi)
- Text including headline, sub-title, introduction and full description of methods & materials/equipment used
- Case Report or description of system improvements (Technical Notes)
- Correspondence address
- Literature (no more than 10 references)
- Separate, continuous numbered image- and table captions

Text

The article should be saved in Microsoft Word (PC format) if possible, and, if not, in text only.

Please indicate the software program and version used (Microsoft Word 2007, etc.) and whether it is a PC or Macintosh formatted document. If e-mailing, make sure to send it as an attachment, rather than embedded in the e-mail message.

Symbols, formulas and abbreviations

Symbols, Greek letters superscripts/Subscripts must to be identified clearly. Furthermore, the figure 1 (one) and the letter l (el) as well as the capital letter o and the figure 0 (zero) should be easy to differentiate.

All abbreviations including units of measure, chemical names, technical or medical acronyms, names of organisations or institutions should be defined when they first appear in the text (e.g. congestive heart failure (CHF). Please refrain from using unfamiliar abbreviations, clinical slang or jargon.

Images, art and tables

Cite all figures and tables in text, preferably in consecutive order.

Please include a caption for each figure. All captions for each figure, should be separate from the text, at the end of the manuscript on a separate page. Captions should avoid duplication of text material. Credit lines for artwork can appear at the end of the corresponding caption by stating: (Provided by first initial, last name). Black out (or give clear instructions which parts should be blackened out) of the images to not violate any data protection regulations (e.g. patient data)

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Authors should indicate if they would like to have artwork returned.

Each table should have a title, and all abbreviations should be spelled out or explained in a footnote.

Style

Title page should include full names, degrees and titles of authors, and affiliations (name of institution, city and state) for use in a by-line, as well as phone and fax numbers to facilitate sending edited copy back to author for approval.

Define all symbols, abbreviations and acronyms on first reference.

All manuscripts should be written in a third-person style, unless the article is specifically an editorial or first-hand review.

References

A maximum of 10 references is suggested. Complete references should be listed in order of citation in text, NOT alphabetically. Up to four authors will be listed; if there are five or more authors, only the first three will be listed, followed by et al. Within the text, reference numbers should appear as footnotes in parentheses or in superscript text at the end of each appropriate citation. Please do not use Microsoft Words endnote feature, as this causes major problems in the editing phase.

In addition, if the reference is not in English, please indicate the language of publication.

Journal example

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Book example

Welch KMA, Barkley GL. Biochemistry and pharmacology of cerebral ischemia. In: Barnett JHM, Stein BM, Mohr JP, Yatsu FM, eds. *Stroke: pathophysiology, diagnosis and management*. New York: Churchill Livingstone, 1986:75-90.





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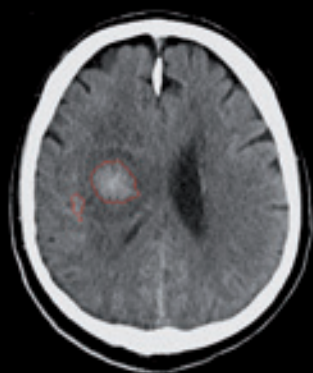
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AUTOStroke solution

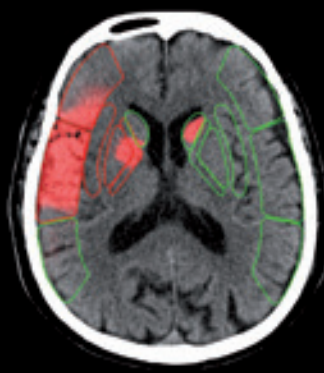
As part of our Automation Platform offering, we've created an innovative solution that helps optimize treatment outcomes for stroke patients when speed and accuracy are everything.



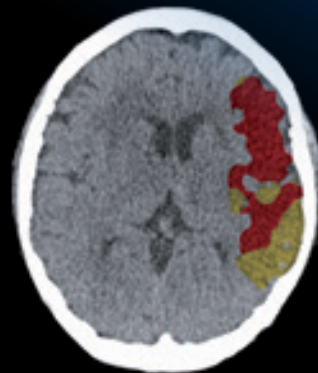
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Intracranial Hemorrhage



ASPECTS



CT Large Vessel Occlusion



CT Brain Perfusion maps