Cartesion Prime

Navigate to personalized care

Digital PET-CT powered by AI

Navigate to personalized care

Navigation is all about looking at the paths laid out in front of you and choosing the one that gets you where you want to be. But if you can't see the obstacles standing in your way, the journey is likely to be significantly harder for everyone. In line with our Made for Life philosophy, Canon Medical is proud to offer a new path to digital PET-CT that helps you see through the noise with our Advanced intelligent Clear-IQ Engine (AiCE) deep learning reconstruction technology.

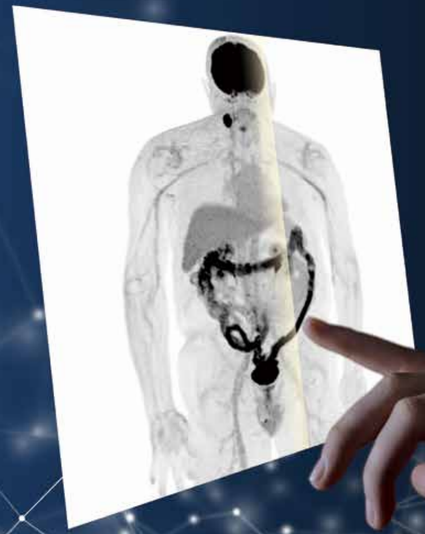
Welcome to the age of AI-assisted digital PET-CT

Cartesion Prime has been developed to transform PET-CT with our Advanced intelligent Clear-IQ Engine (AiCE) Deep Learning Reconstruction (DLR) technology to distinguish true signal from noise, so you can quickly obtain clear and distinct images.

To aid in fast and confident clinical results, compared to Gaussian filtering, AiCE DLR can provide superior performance in:

- Image quality
- Quantification accuracy
- Count dependency
- Preservation of quantification

AiCE
Integrated Intelligence



45% better signal-to-noise ratio*
compared to Gaussian post-filter.

82.9% better quantification*
compared to Gaussian post-filter.

up to 75% shorter scanning times*
compared to Gaussian post-filter.

* Compared to ToF OSEM with point-spread-function (PSF) and Gaussian post-filter (GF). Based on bench tests results for 10 mm hot sphere in NEMA IQ phantom.

Training phase in factory

Using high-quality images AiCE learns to differentiate between signal and noise in low-quality images.

Low-quality input data

Deep Learning

High-quality input data

Operational phase in clinic

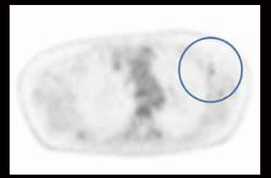
Using the intelligence from the training phase, AiCE has the potential to aid in fast and confident clinical results by providing high-quality images.

Low-quality input

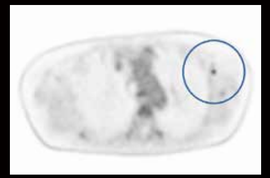
Deep Convolutional Neural Network

High-quality output

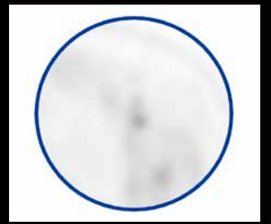
Distinct, high-quality PET-CT images



Gaussian post-filtered OSEM



AiCE



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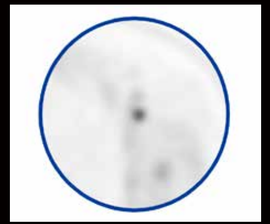
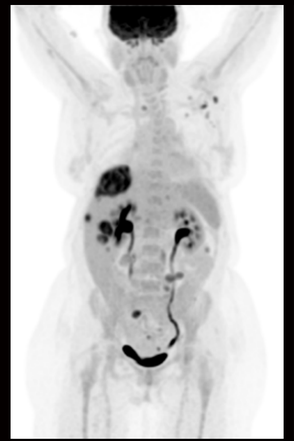


AiCE

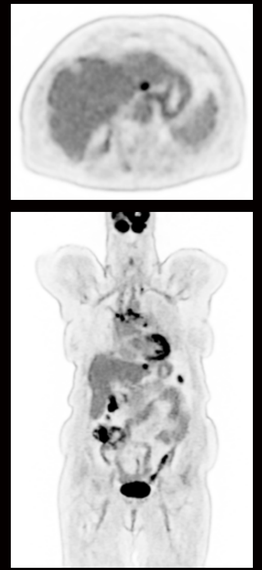


Gaussian post-filtered OSEM

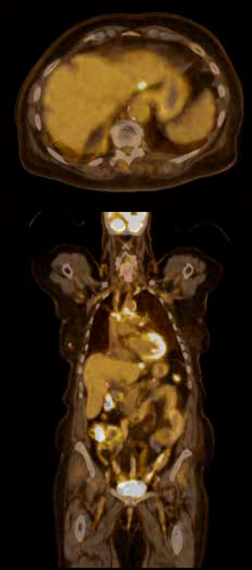
AiCE

Dose 278 MBq (7.5 mCi), ^{18}F-FDG
Uptake 56 minutes
Recon Gaussian post-filtered OSEM (OSEM+ToF+PSF, 4 iterations, 12 subsets, 6 mm Gaussian)
Recon Advanced intelligent Clear-IQ Engine (AiCE)

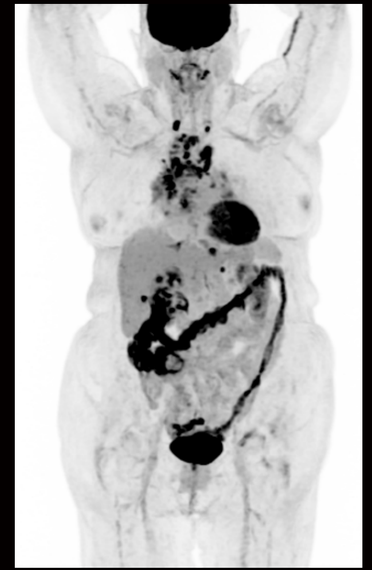
AiCE



AiCE



AiCE



AiCE

Dose 266.4 MBq (7.2 mCi), ^{18}F-FDG
Uptake 53 minutes
Recon Advanced intelligent Clear-IQ Engine (AiCE)

Courtesy of Steinberg Diagnostic Medical Imaging, USA

The clinical results described here are the experience of the authors. Results may vary due to clinical setting, patient presentation, and other factors.

Chart the right clinical course

With Cartesion Prime's digital PET and AI-assisted technologies, you can confidently diagnose, assess treatment response, and put your patients on the right path for them.

Advance with digital PET

Cartesion Prime is designed to deliver excellent image quality with accurate quantification, improve throughput, optimize* dose, and reduce total cost of ownership.

We have made this possible by harnessing the abilities of digital PET to realize high photon detection efficiency, increased sensitivity, timing resolution, and compact packaging.

* Optimization of dose is only recommended within dosing ranges that appear in approved drug labeling.

The SURECount detector

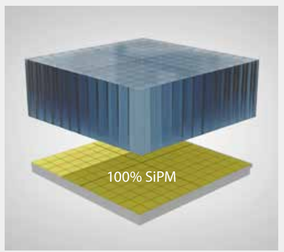
Each of our technologies built into the SURECount detector have been designed to help you read images quickly and easily for maximum time and cost savings across the board.

SiPM photosensors

The use of SiPM photosensors has inspired design choices that can impact image quality, scan times, and dose efficiencies; all of which lead to better patient care. Because there are many ways to design a PET detector with SiPM, the ability of a PET detector to maximize its impact goes beyond just including SiPM. SURECount, Cartesion Prime's digital PET detector, is developed to leverage the potential of SiPM photosensors while taking full advantage of the design of the entire PET detector from coverage to cooling.

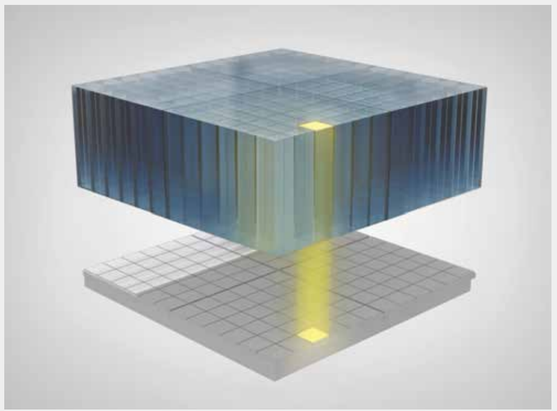
100% coverage

The SiPM covers the entire scintillator area. This ensures high photon-detection efficiency and improves the sensitivity and timing resolution of the scanner.



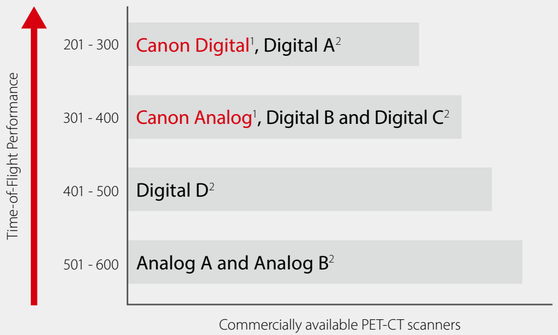
One-to-one coupling

One-to-one coupling is literally giving each individual crystal its own SiPM photosensor. When one-to-one coupling is not utilized, the crystals have to share SiPMs while they are all busy creating the light that will ultimately make a patient image. By giving each crystal its own SiPM photosensor, this design can help the resolution of the final patient image.



263 ps ToF resolution*

The timing resolution improvements on the Cartesion Prime can have a significant impact on image quality, scan time, and dose efficiency. However, just having SiPM does not mean this improvement can be realized to its full potential. With design choices like 100% coverage, one-to-one coupling, and compton event recovery, Canon Medical has been able to achieve an impressive 263 ps ToF performance*.

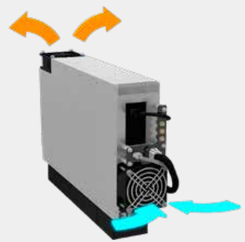


27 cm Axial FOV

Having a very large axial Field of View (FOV) can be used for many performance improvements in PET imaging. With a 27 cm axial FOV, Cartesion Prime can deliver on the ability to provide faster scans that translates to a more comfortable experience for patients. The large axial FOV also improves the scanner's sensitivity, which supports dose efficiencies for patients.

Air-cooling technology

Air-cooling is an attractive option for optimizing operational efficiencies by avoiding the costs and complexity associated with water cooling.



* Typical system performance

[1] Based on internal measurements available at time of publication

[2] Based on competitive literature available at time of publication

Keep patient and operator care on track

By putting both the patient and the operator at the center of every design decision, a better experience can be achieved with faster, more comfortable scans, and a more streamlined workflow.

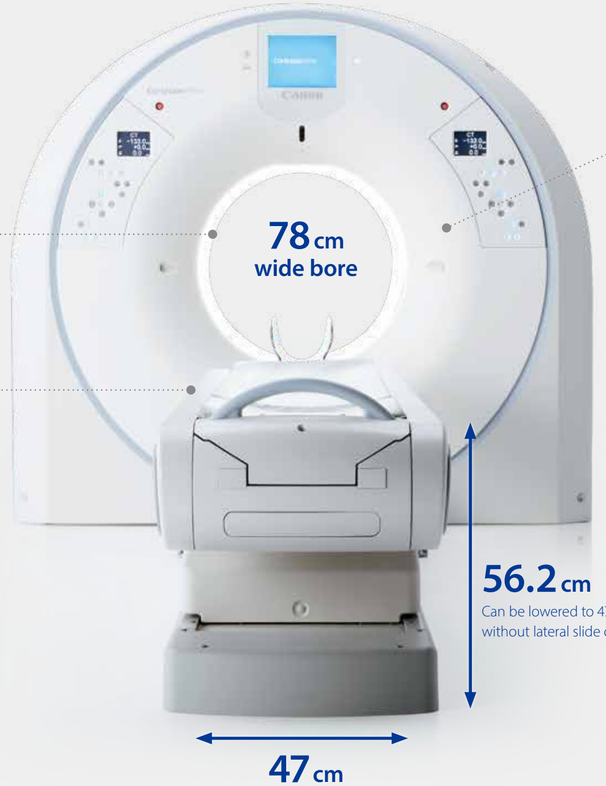
A patient-centric design

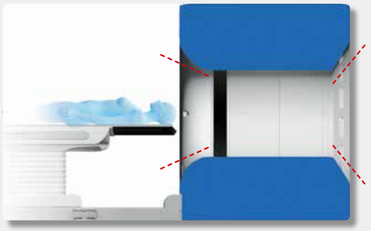
Cartesion Prime is designed to address many aspects of the patient experience that focus on comfort during the scan process.

The scanner includes a wide 78 cm bore with a flared-gantry design, as well as a wide patient couch that creates a more open and comfortable environment. With a low minimum scanner bed height, patients will be able to more easily and safely navigate getting on and off the scanner bed when assistance is needed.

Wide bore

Wide couch



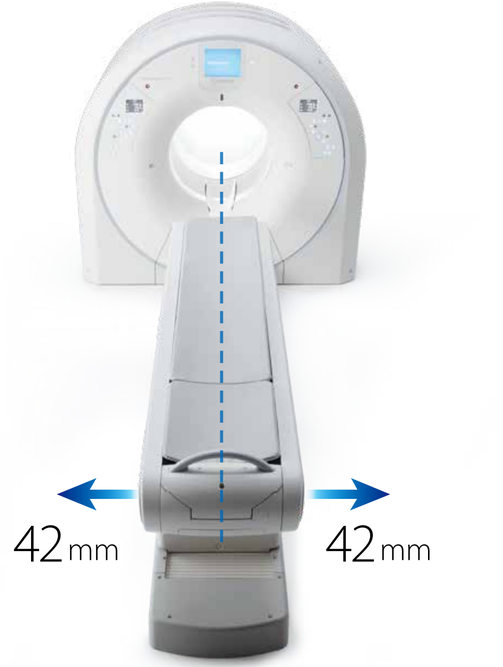


Flare gantry design on front and back

Low minimum height

An operator-centric design

Cumulative radiation risks and throughput issues are among the challenges that operators face when performing imaging procedures. Cartesion Prime incorporates a variety of functions based on technologies that were developed for the high-end Aquilion Prime SP CT scanner to significantly help reduce exposure dose to the operator.



The Tech-Assist Lateral Slide* enables faster exams and improved workflow while accurately positioning the patient in iso-center for best image quality and dose modulation. It also helps to reduce exposure dose to the operator as adjustments to the patient's position can be done at the same push of a button.

SUREPosition and Tech-Assist Lateral Slide

Improve the accuracy, safety, and efficiency of your PET-CT scans with innovative technologies that let you remotely position your patients from the console:

- Safer for technologists
- Faster patient setup
- More comfortable for patients
- Accurate iso-center scanning

SUREPosition remotely adjusts the patient to iso-center ensuring best practice in PET-CT accuracy – without the need for repeating the scanogram.

* Option

Guide your business with confidence

With a small, lightweight, air-cooled system that optimizes scan times and streamlines your workflow, you'll have everything you need to boost efficiency across every aspect of your business.

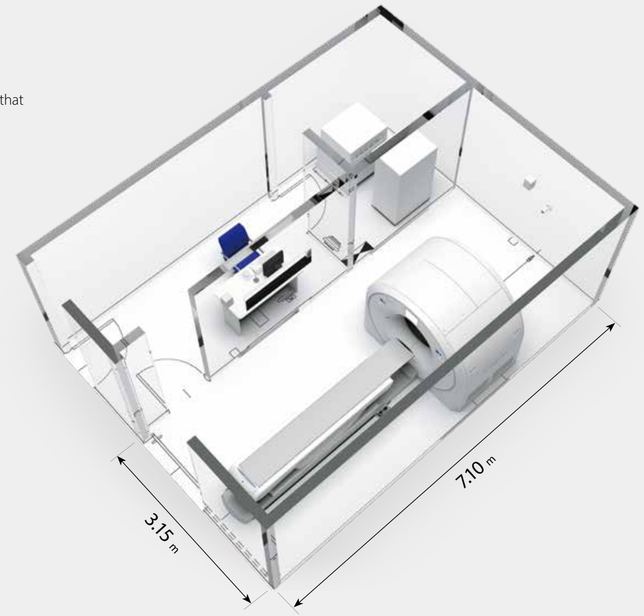
A system tailored to your business needs

Cartesion Prime offers the ability to site a digital PET-CT in smaller rooms and with air-cooling technology. Both of these design choices can help alleviate some of the challenges found with other digital PET designs that require larger spaces and water cooling to run the scanner.

Compact room design

At just 22.4 m^2, Cartesion Prime is a space-efficient digital PET-CT system that fits in a smaller installation space and gives you more room to work in.

Minimum Footprint



Air-cooling technology

Choosing air cooling allows for more opportunities to fit a digital PET-CT into existing spaces. This provides flexibility to manage your investment by not having to support costly room renovations or the added complexity for new construction when water cooling is required.

More opportunity with the Aquilion Prime SP CT

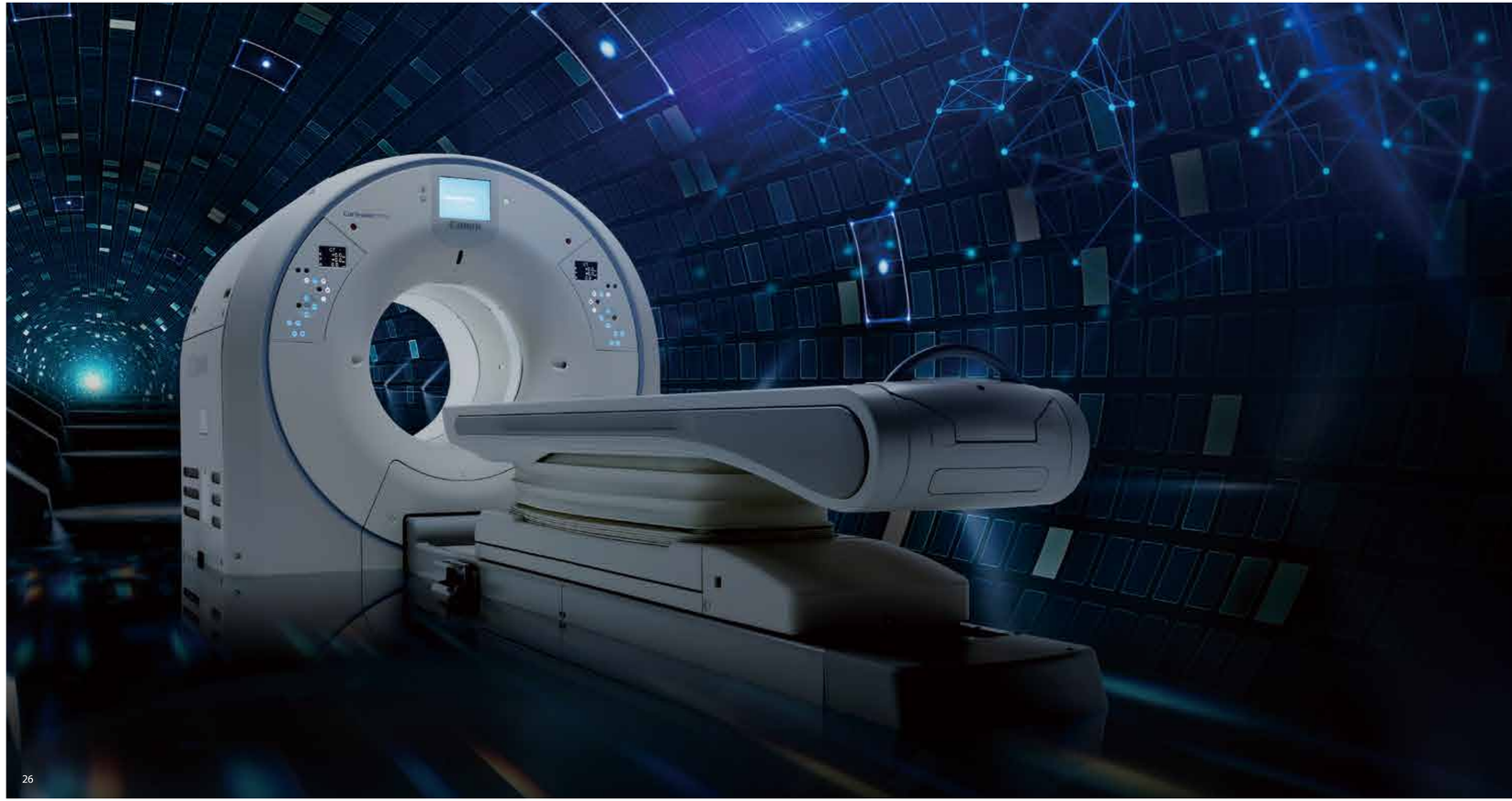
Cartesion Prime leverages Canon Medical's high-end Aquilion Prime SP CT system to combine advanced technologies in PET with the premium CT features that come standard with every scanner.

From fast patient throughput to robust cardiac scanning and complete diagnostic capabilities, the Aquilion Prime SP is the CT system of choice for all your imaging needs.

Plus, with innovative AI-assisted image reconstruction technologies built in, this powerful PET and CT duo can help you expand your clinical capabilities, enhance your productivity, and better capitalize on your investment.

Our premium Aquilion Prime SP CT features:

- **Advanced intelligent Clear-IQ Engine (AiCE)**
  AiCE uses Deep Learning technology to match the spatial resolution and low-noise properties of advanced model-based iterative reconstructions.
- **Advanced hardware**
  Get PUREViSION 0.5 mm × up to 80-row detector and PUREViSION Optics hardware found on our high-end systems for ultimate performance.
- **Wide bore**
  A 78 cm bore offers high levels of patient access and comfort.
- **Standard features**
  Dose reduction, metal artifact reduction, and features to enhance workflow come standard with every system.
- **Advanced optional features**
  To support a true dual-use environment, find advanced features like dual energy, iodine mapping, and the ability to support cardiac CT applications.



PET Performance		
Scan	Crystal size	4.1 × 4.1 × 20 mm
	Crystal material	Lutetium-based
	Gantry aperture	78 cm
	Transaxial FOV	70 cm
	Axial FOV	27 cm
	System energy resolution	11.4% (typical)
	ToF timing resolution	263 ps (typical)
Count-rate*2	System sensitivity	> 13 cps/kBq
	Peak NECR	> 160 kcps
Reconstruction	Deep learning reconstruction	AiCE*4
Spatial resolution*2	Radial: FWHM @1 cm	< 5.0 mm
	Radial: FWHM @10 cm	< 5.5 mm
	Radial: FWHM @20 cm	< 7.0 mm
	Tangential: FWHM @1 cm	< 5.0 mm
	Tangential: FWHM @10 cm	< 5.5 mm
	Tangential: FWHM @20 cm	< 6.0 mm
	Axial: FWHM @1 cm	< 5.0 mm
	Axial: FWHM @10 cm	< 5.5 mm
	Axial: FWHM @20 cm	< 6.0 mm
Spatial resolution (PSF)	Radial: FWHM @1 cm	1.50 mm
	Radial: FWHM @10 cm	1.80 mm
	Radial: FWHM @20 cm	1.94 mm
	Tangential: FWHM @1 cm	1.32 mm
	Tangential: FWHM @10 cm	1.30 mm
	Tangential: FWHM @20 cm	1.36 mm
	Axial: FWHM @1 cm	1.69 mm
	Axial: FWHM @10 cm	1.95 mm
	Axial: FWHM @20 cm	1.35 mm

CT Performance		
Scan	Gantry aperture	78 cm
	FOV	50 cm (70 cm Ext. FOV*1)
	Rotation speed	0.35 sec
	PURE VISION detector	Up to 80 rows*5 (4.0 cm)
	Slice thickness	0.5 mm
	Number of slices	Up to 160*5 with coneXact
	Tube current modulation	SURE Exposure 3D
	X-ray tube maximum output	60 kW, 72 kW*5
	X-ray tube heat capacity	7.5 MHU
Dose	Dose reduction functions	AIDR*3 3D Enhanced
	Deep learning reconstruction	AiCE*4
	Dose management	• XR-29 compliant • Dose check (NEMA XR-25) • DICOM SC exposure summary • DICOM SR compliant dose report
Image quality	Reconstruction method	• Cone beam • Fan beam • SEMAR (Single Energy Metal Artifact Reduction)
	Image noise (Standard deviation)	< 0.5%
	Spatial resolution@ cut off	21.5 lp/cm (For reference)
	High-contrast detectability	0.31 mm
	Low-contrast detectability	2 mm @ 0.3% at 15.7 mGy

NOTE:
*1 Not intended for diagnostic purposes for CT exams
*2 Measured according to NEMA Standards Publication NU2-2018
*3 Adaptive Iterative Dose Reduction
*4 Advanced intelligent Clear-IQ Engine (Option)
*5 Option

Disclaimer: Any reference to X-ray exposure is intended as a reference guideline only. The guidelines in this document do not substitute for the judgment of a healthcare provider. Each scan requires medical judgment by the healthcare provider about exposing the patient to ionizing radiation. In clinical practice, the use of the AIDR 3D features may reduce CT patient dose depending on the clinical task, patient size, anatomical location, and clinical practice. A consultation with a radiologist and a physicist should be made to determine the appropriate dose to obtain diagnostic image quality for the particular clinical task.

Due to local regulatory processes, some of the products included in this brochure may not be available in each country. Please contact your sales representative for the most current information.

Cartesion Prime

CANON MEDICAL SYSTEMS CORPORATION
https://global.medical.canon

Model number: PCD-1000A MCANM0041EAB 2021-08 CMSC/Produced in Japan

Canon Medical Systems Corporation meets internationally recognized standards for Quality Management System ISO 9001, ISO 13485.
Canon Medical Systems Corporation meets the Environmental Management System standard ISO 14001.

Made For life