

DRTECH

EXTRON

Experience True Digital
for Low Dose Imaging

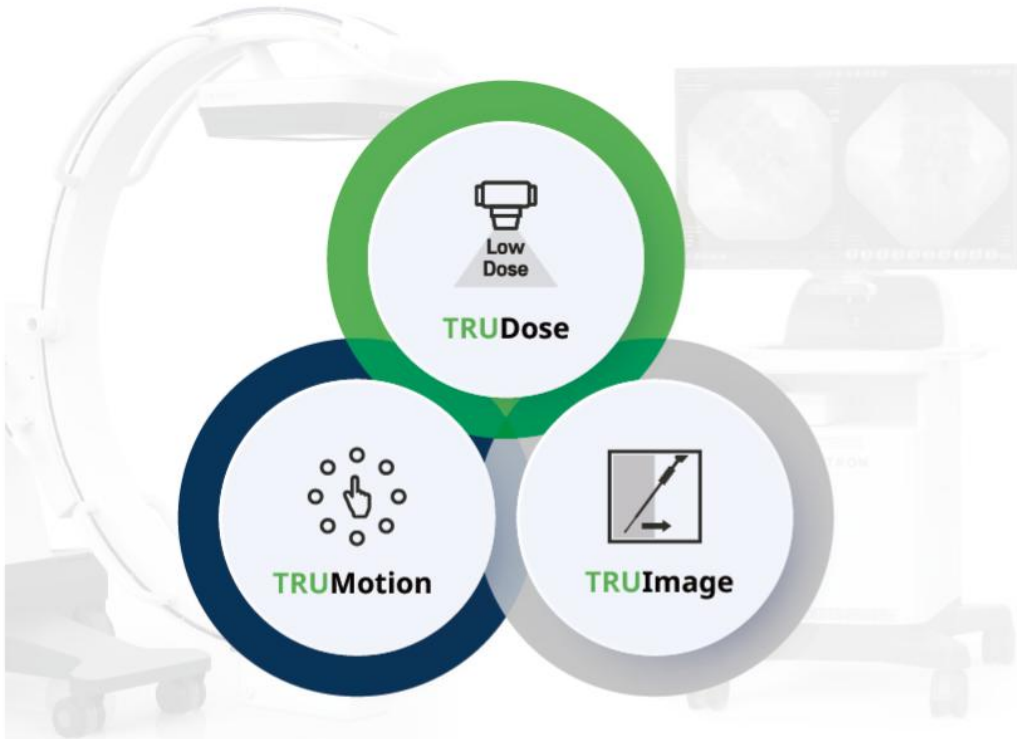
EXTRON 7 / 5

EXTRON 3

EXTRON 3 Omni



Powered by TruDigital Architecture



Premium imaging platform TRUDIGITAL Architecture provides flawless low dose imaging to meet the high imaging standards of any challenging surgical procedures. TRUDIGITAL powered by DRTECH’s premium grade EXPEED surgical detector and state-of-the-art image processing technology provides faster and more accurate data processing resulting in superior image resolution and low-noise dynamic imaging performance.

TRUDose: Ultimate Low Dose Imaging

Low-dose, high-performance surgical imaging system with proven detector & dose reduction technology minimizing dose exposure for physicians, operators and patients



Dynamic
Pulse Mode



Beam Filter
Technology



ABC & ABM



RNR
Real-time Noise
Reduction

TRUImage: High Resolution, Low Noise Imaging

Advanced Real-time image processing technology with distortion-free FPD technology, highest image quality is guaranteed



FPD
Large FOV



RNR
Real-time Noise
Reduction



Needle
Enhancement



Metal
Detection

TRUMotion: Flawless Dynamic Imaging

User-friendly and usability-focused design for increased efficiency & convenience that help reduce surgery time and maximize surgical accuracy in any surgical environment



Smart Memory
Position



Touch
OP Console



Wide
C-arc



Drag
Collimation

Premium Low-Dose Detector Technology



Premium IGZO FPD that delivers clean, noise-free, high-resolution images at low dose



Small pixel size of 140 µm / 148µm for high-resolution images



Real-time delay-free imaging with fast image transfer speed



Provides wide FOV square images without distortion



Proven durability to maintain high-resolution image quality for long-term use



Premium Low-Dose IGZO Detector

Premium IGZO FPD that delivers clean, noise-free, high-resolution images at low dose



EXPEED 2121P / 2323P / 3030P

*2323P Only Available in Selected Countries



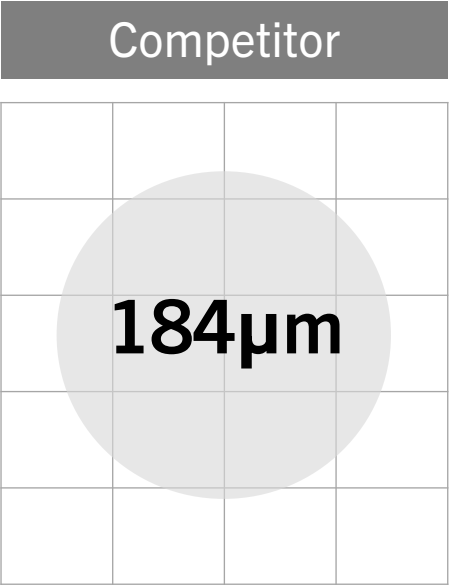
10 times faster electron mobility compared to conventional a-Si

DRTECH’s next-generation IGZO TFT has 10-times faster electron transfer speed and significantly lower electrical leakage with significantly reduced image noise compared to a-Si TFT, providing high-definition diagnostic images at the lowest dose.

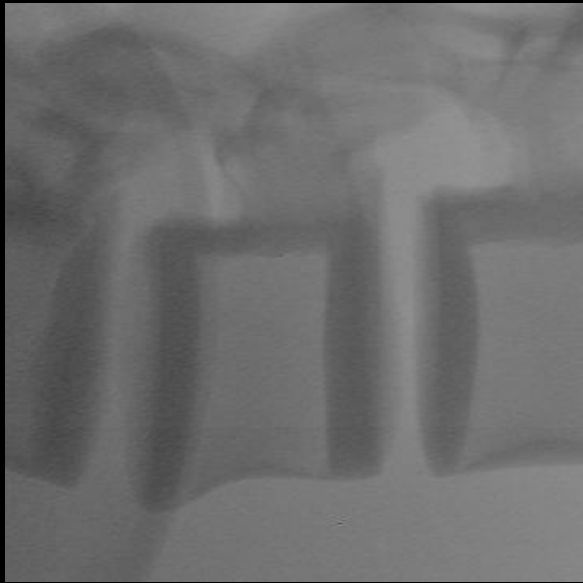
In addition, IGZO FPD's fast image transfer speed enables fast real-time image output without delay resulting in less image lag and faster image display.

Small Pixel Size, High Resolution

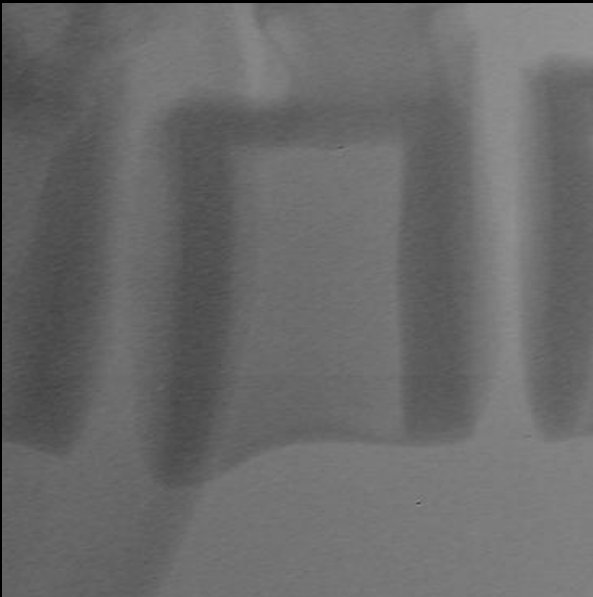
Clear & high-resolution images with
smaller pixel size of
140 μm /148 μm



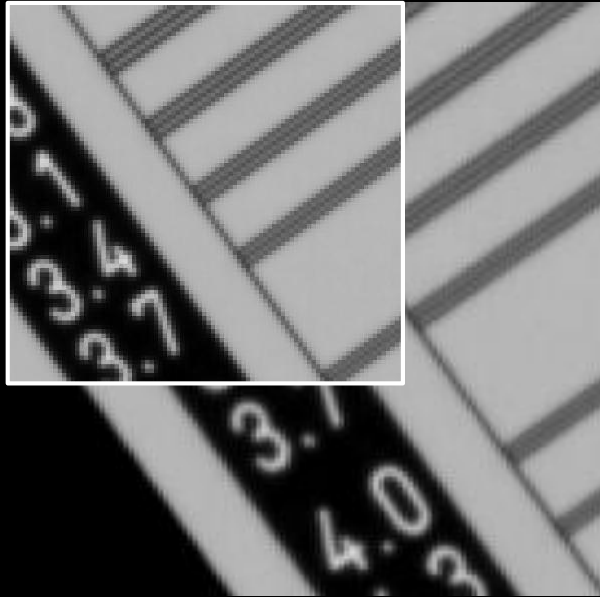
Full size (21x21)



Magnification Mode



Magnification mode 2 size

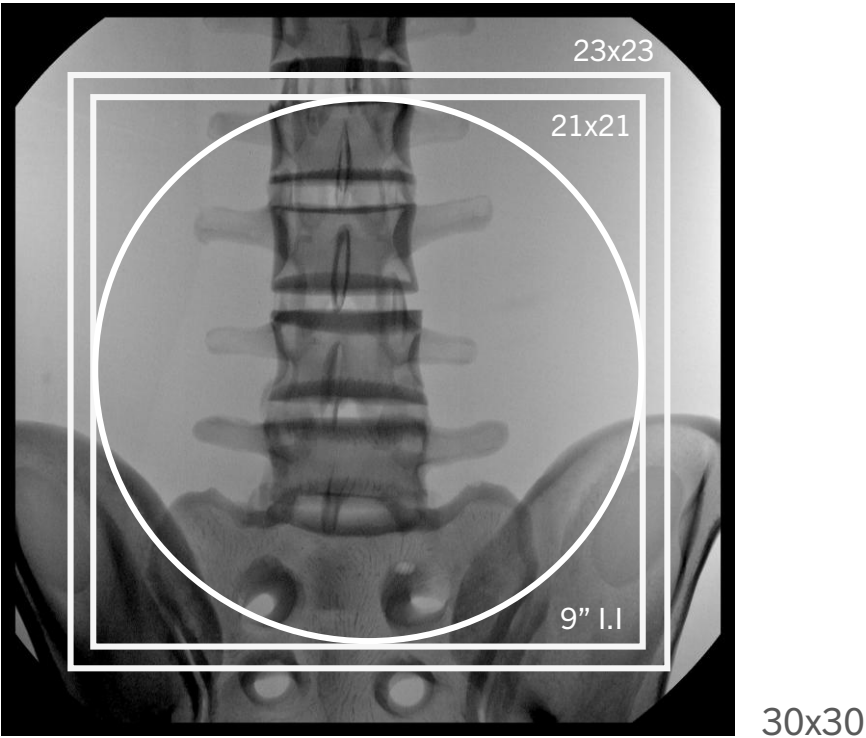


Spatial Resolution phantom

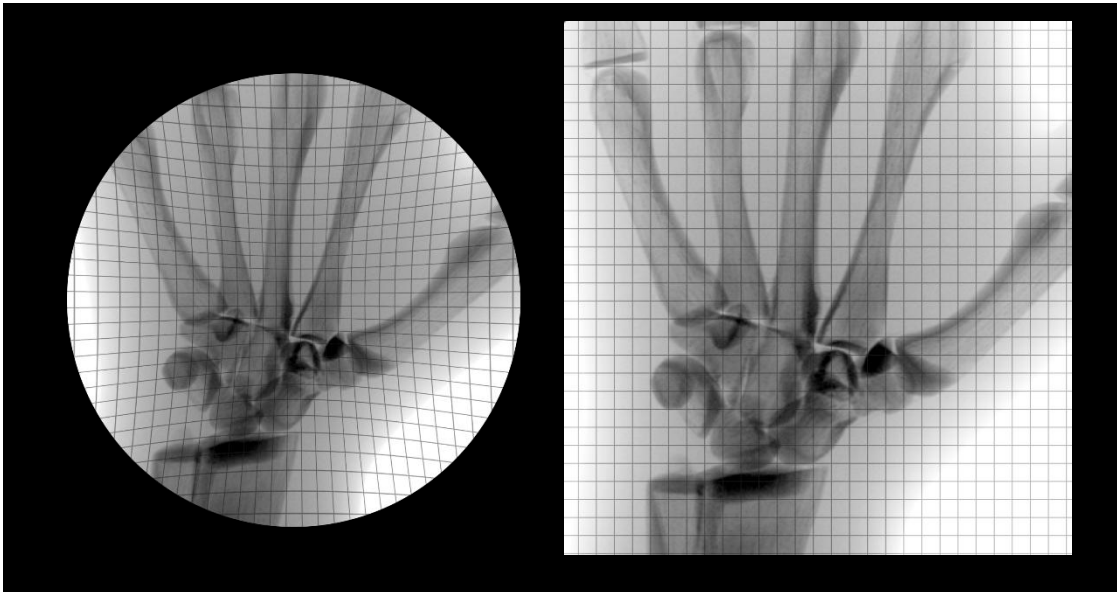
Large Field of View (FOV) without Image Distortion

Improved surgical accuracy with Large FOV without Image distortion

21 X 21cm / 30 x 30cm FPD's Large FOV provides more anatomical information compared to I.I



FPD provides accurate square images without distortion



Low Dose Technology



**ABC (Auto Brightness Control)
& ABM (Auto Brightness Memory)**



Easy Grid removal for Dose Reduction



Beam Filtration for Dose Reduction



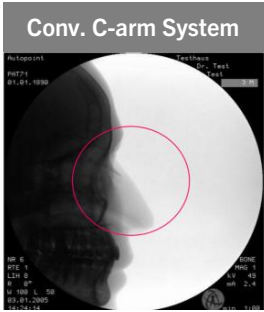
Dose Comparison : I.I & FPD

ABC (Auto Brightness Control) & ABM (Auto Brightness Memory)

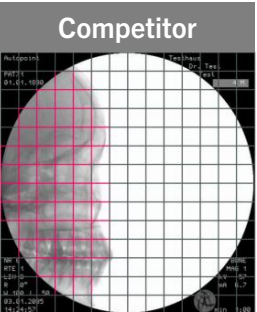
ABC (Auto Brightness Control)

As the object is detected pixel to pixel, **object detection rate is improved drastically**. With this accurate detection method, high quality images are provided within 0.5secs resulting in low dose imaging.

Object Detection Technology



Measure the brightness of ONLY the center of the image and then control the dose



Measure the brightness of the object by dividing the area of the image and then control the dose

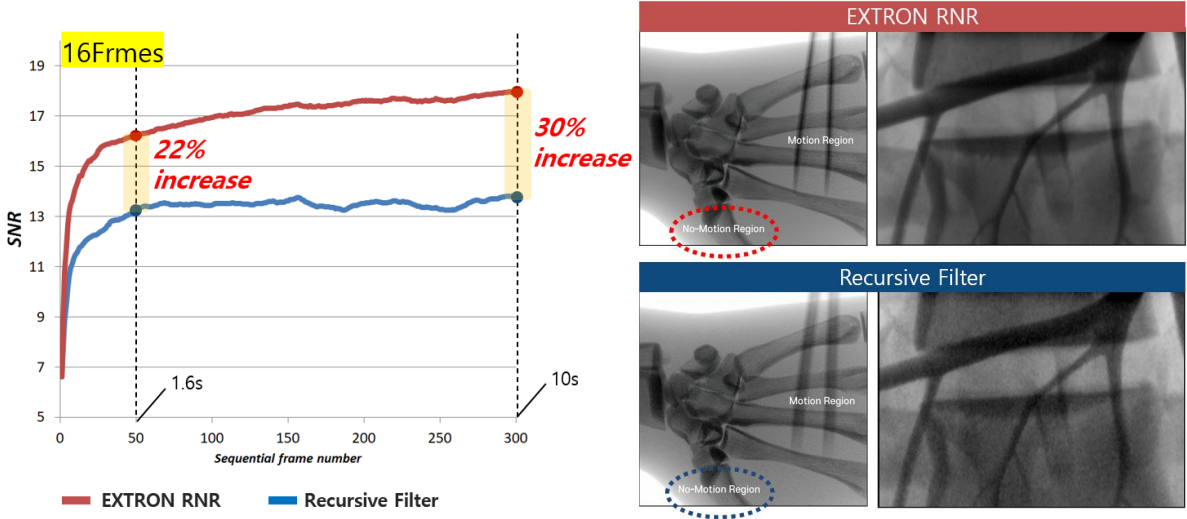


Analyze all pixels in the image to control the dose after measuring the brightness of the object

ABM (Auto Brightness Memory)

By storing and fixing the brightness (dose data) for each position, the brightness can be maintained even when the exposure condition is reduced, resulting in **dose reduction of up to 25%**.

Image Comparison with object during surgery



X-ray Dose Mode for Minimum Dose Imaging

EXTRON offers a variety of Dose modes for optimal low-dose imaging

**Specification may change without notice*

X-ray Mode	Option	Dose
Continuous	High Dose mode	120%
	Normal	100%
	Low Dose mode	70%
	Min Dose mode	40%
Dynamic Pulse Low Dose	Motion: 20pps	
	No Motion: 10pps	
Pulse Low Dose	Standard Dose mode	40%
	Half Dose mode	20%
	Quarter Dose mode	10%

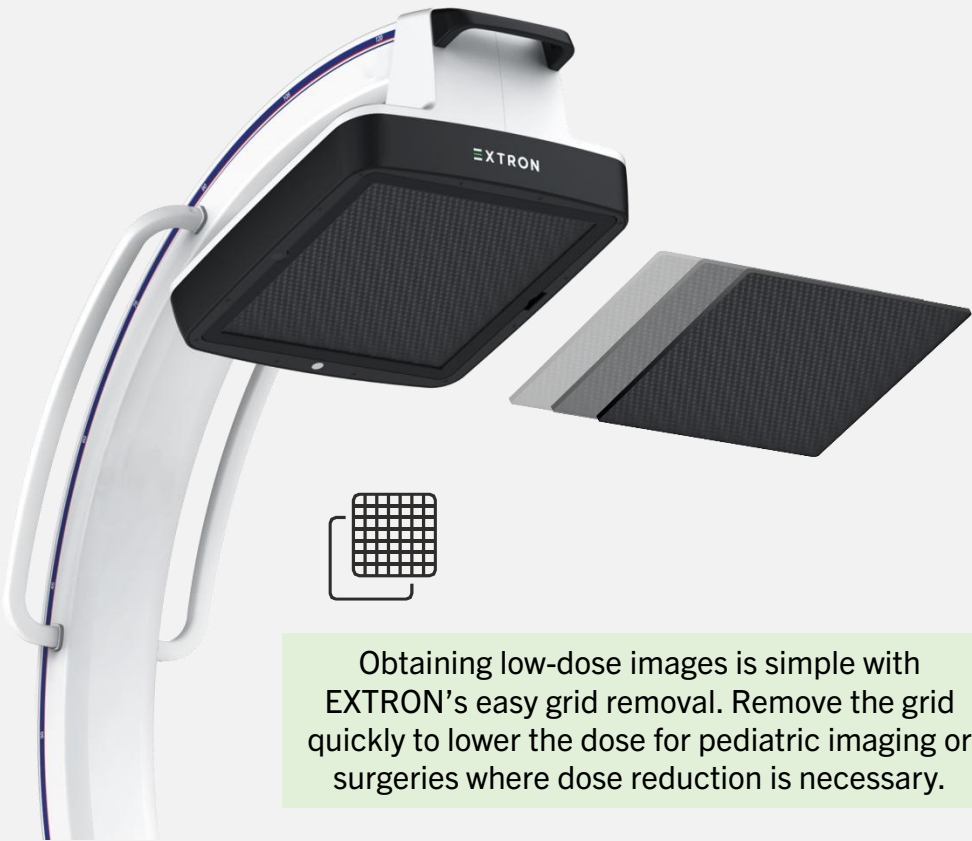
Dynamic Pulse Low Dose Mode

EXTRON detects object motion in real-time and applies the most optimized pulse rate for best image quality and dose.

If motion is sensed, EXTRON automatically increases the pulse rate for high image quality and decreases the pulse rate when there is no motion to minimize the dose exposure.

Grid Removal & Beam Filtration

Easily Removable Grid for Dose Reduction



Obtaining low-dose images is simple with EXTRON's easy grid removal. Remove the grid quickly to lower the dose for pediatric imaging or surgeries where dose reduction is necessary.

Improved beam-quality and reduced dose-exposure by Beam Filtration



Dual Metal Filter

Competitor Dose Comparison

Company	DRTECH	GE	Philips	Ziehm
Model	EXTRON 5	OEC9900 Elite	Veradius Unity	Vision FD
Image				
Acquisition Mode	Continuous	Continuous	Pulse 15	Pulse 25
Exposure	78kV / 3.9mA	93kVp / 4.3mA	78kV / 4.65mA	94kV / 17.5mA
Dose (Conti)	20.94mGy/min	51.8mGy/min 2.5X	-	-
Dose (Pulse 15)	11.94mGy/min	-	22.35mGy/min 1.9X	-
Dose (Pulse 25)	18.32mGy/min	-	-	39.32mGy/min 2.2X

Competitor Dose Comparison

EXTRON Dose Performance
EXTRON vs. OEC 9900 Elite

	EXTRON		OEC 9900 Elite	
Exposure	78kV	3.9mA	93kV	4.3mA
Accumulated Dose	20.94mGy/min		51.8mGy/min	

EXTRON



GE OEC 9900 Elite



Dose Increase
2.5 X



Competitor Dose Comparison

EXTRON Dose Performance
EXTRON vs. Veradius Unity
Pulsed mode @ 15pps

	EXTRON		Veradius Unity	
Exposure	78kV	3.9mA	78kV	4.65mA
Accumulated Dose	11.94mGy/min		22.35Gy/min	

EXTRON



Dose Increase
1.9 X



Philips Veradius Unity



Competitor Dose Comparison

EXTRON Dose Performance
EXTRON vs. Ziehm Vision FD
Pulsed mode @ 25pps

	EXTRON		Ziehm Vision FD	
Exposure	78kV	3.9mA	94kV	17.5mA
Accumulated Dose	18.32mGy/min		39.32Gy/min	

EXTRON



Dose Increase
2.2 X



Ziehm Vision FD



Competitor Dose Comparison

EXTRON Dose Performance
**EXTRON vs. Siemens Healthineers
Arcadis Orbic**

*Continuous exposure for 5 secs.

	EXTRON		Siemens Healthineers	
Exposure	93kV	3.8mA	76kV	7.1mA
Accumulated Dose	16.3mGy/min		73mGy/min	

EXTRON



Dose Increase
4.4 X



Siemens Arcadis Orbic (I.I)



Image Processing Technology



RNR, Real-time Noise Reduction Imaging Technology



Maintain brightness when inserting surgical tools with Metal Detection technology



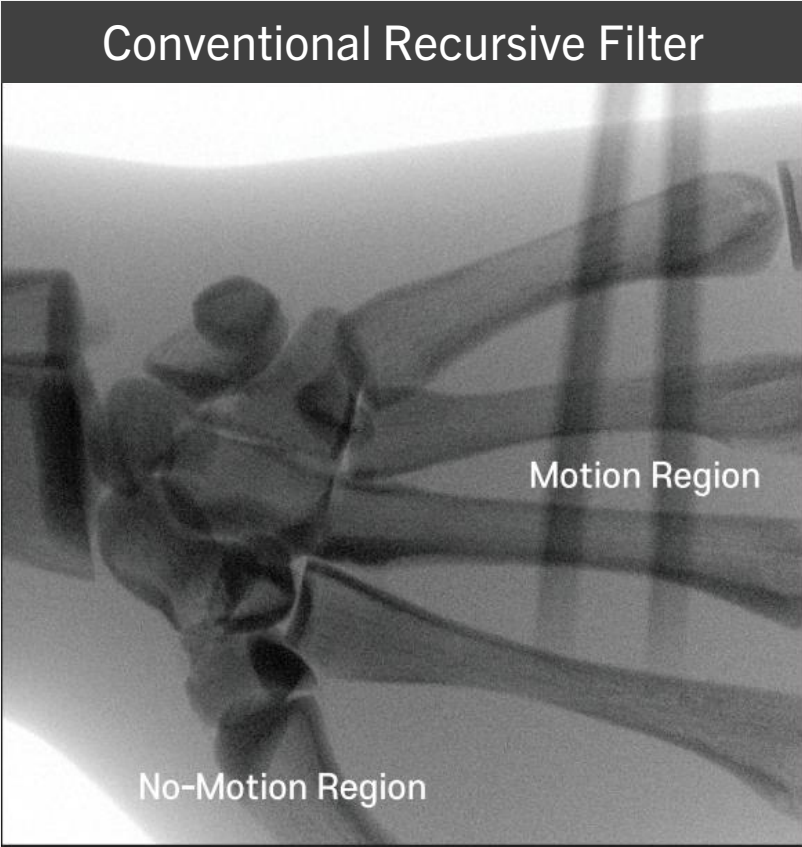
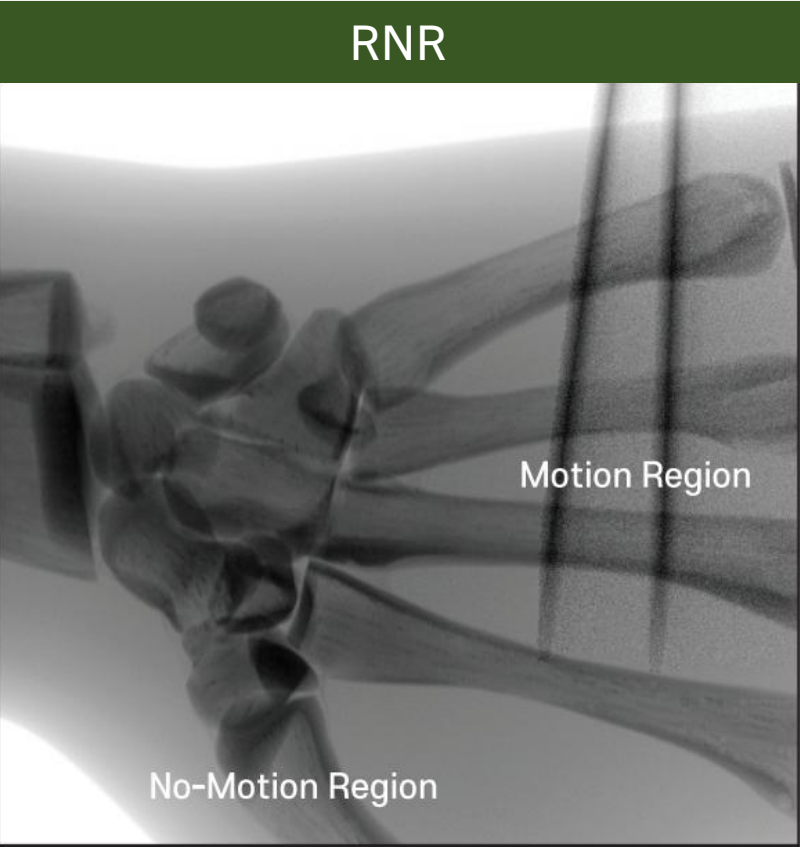
Needle Enhancement



Image Quality

RNR, Real-time Noise Reduction

Real-time motion & non-motion region analysis enables optimal image processing and delivers high-quality low noise images of up to 30% higher SNR compared to competitors



0.2sec fast noise removal



Remove after-image of moving surgical tools



Sophisticated motion detection provides clear, low-noise images even in low-dose mode

RNR : Entire Object Movement

Conventional Recursive Filter	RNR
Degraded image quality due to image lag (After image)	High Image quality with no image lag (After image)
	

RNR: Surgical Tool Movement

Conventional Recursive Filter

quality deteriorated due to overall image noise



RNR

Non-motion noise-free maintains high-quality images

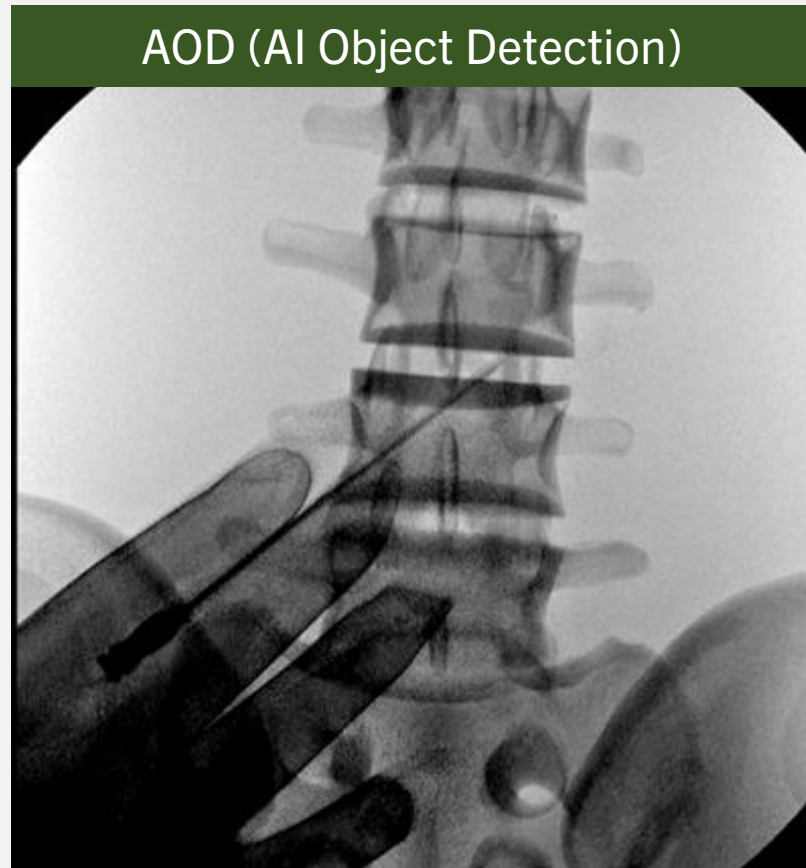


RNR : Adjustable Image Quality with 5 Level options

Level		Comments	Trade Off	Live images with RNR
Level 1		✓ Suitable for real-time Extremity surgeries ✓ No Image Lag ✓ <u>Orthopedic Surgery</u>	• Increased Noise • Decreased Image Lag • Increased Image Lag • Decreased Noise	
Level 2		.		.
Level 3		.		.
Level 4		.		.
Level 5		✓ Suitable for surgeries with localized motion ✓ Spine, Abdomen Surgeries ✓ No Noise ✓ <u>Neuro Surgery</u>		

AOD (AI Object Detection)

AOD applies ultra-fast AI image processing that works instantly even in live surgical environments. By distinguishing metallic objects from anatomical structures, it maintains consistent image brightness and prevents overexposure (whitening) caused by metallic instruments.



Prevention of Image Whitening
Caused by Metallic Surgical Tools

World-first Real-time AI Detection
Technology Applied to Medical
Imaging

Optimized for Real-time Surgical
Use in C-arm Systems

AOD (AI Object Detection) - Metal Detection

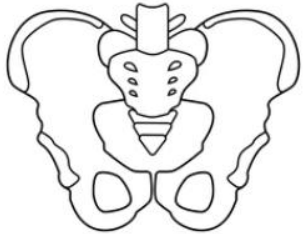
Metal Detection technology maintains the subject at an appropriate brightness even when the surgical tool (metal) enters the image during surgery, preventing excessive radiation exposure or image quality degradation, thereby realizing a constant and excellent image during the surgery.



Needle Enhancement

Needle Enhancement technology prevents the disappearance of the needle even under high-dose conditions, enabling safe surgery.

110kV +
High Dose

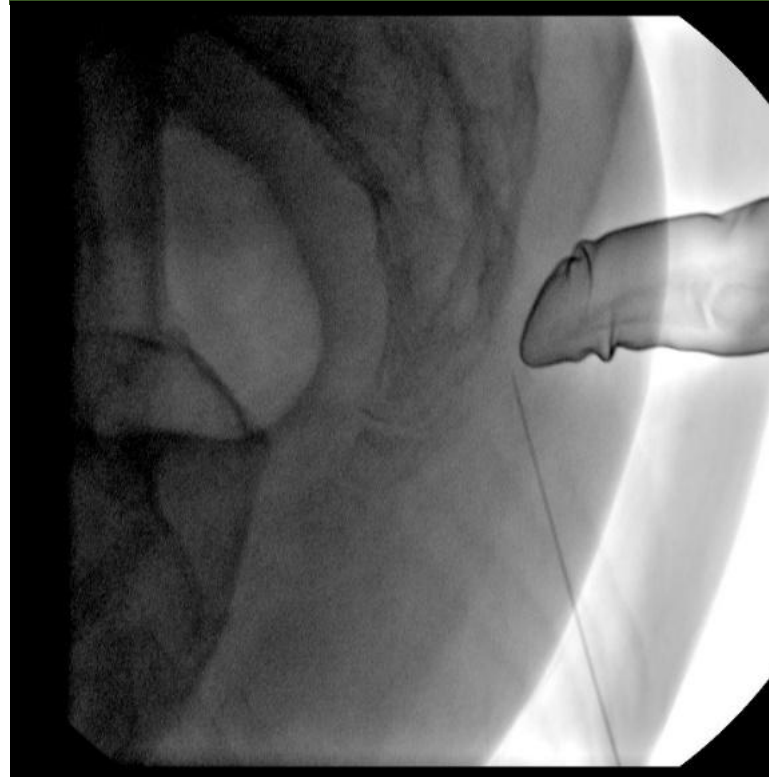


L-Spine Coccyx Lateral

Competitor C-arm system's image showing needle disappearance due to high exposure condition

Clear visualization of the needle with EXTRON

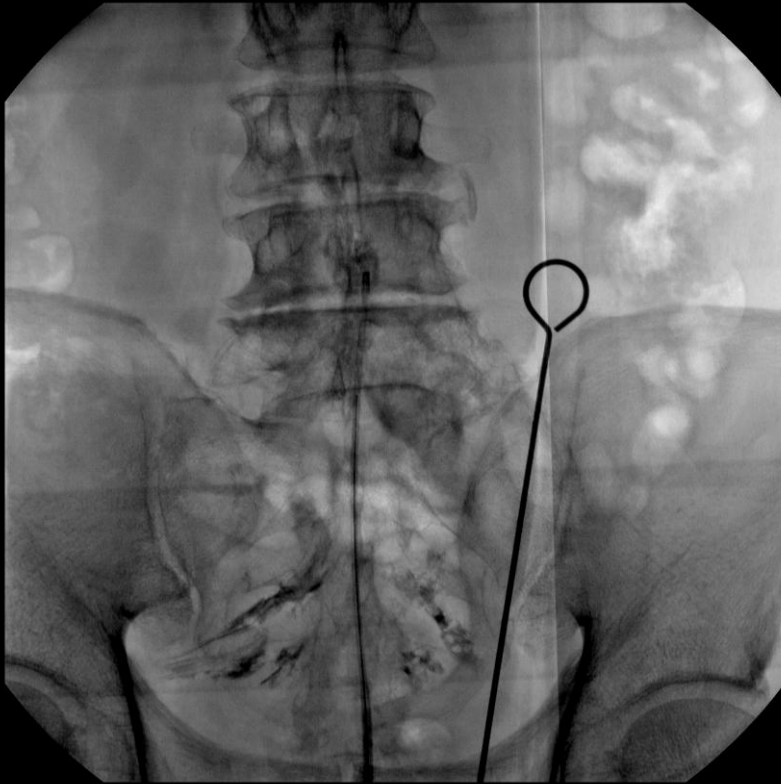
Needle Enhancement



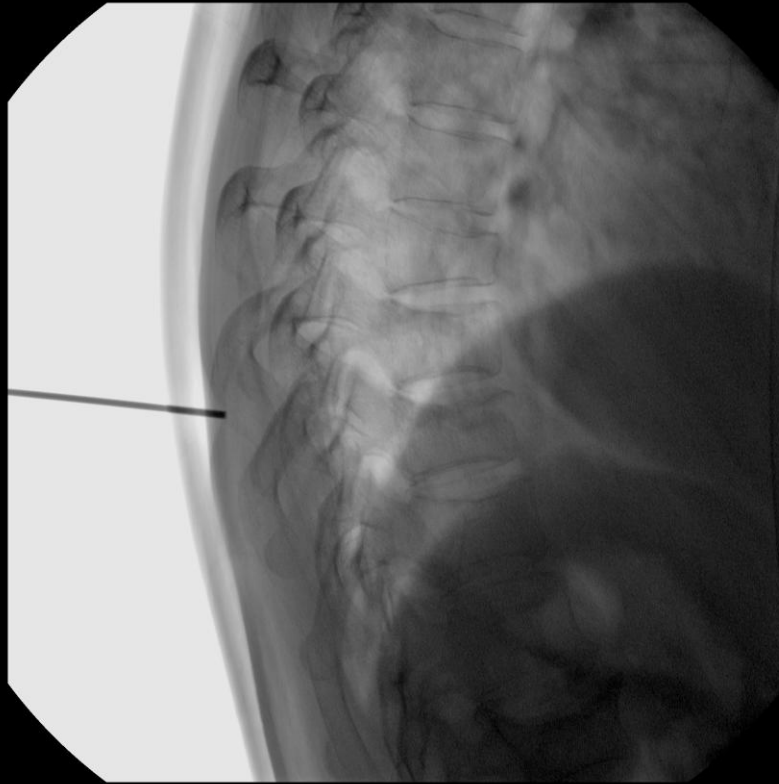
No Needle Enhancement



Clinical Images



L-Spine AP



T-Spine LAT



Coccyx LAT

Clinical Images



Ankle AP



Ankle LAT



Knee



Shoulder

Angiography

Digital
Subtraction
Angiography

Road
Mapping

Max Peak
Opacification

Remask

Bone
Landmark

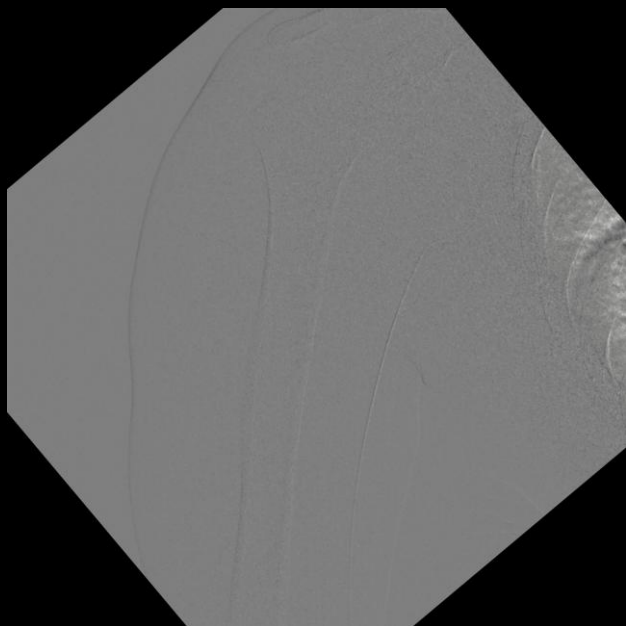
Pixel
Shift

DSA to
Normal
Fluoroscopy

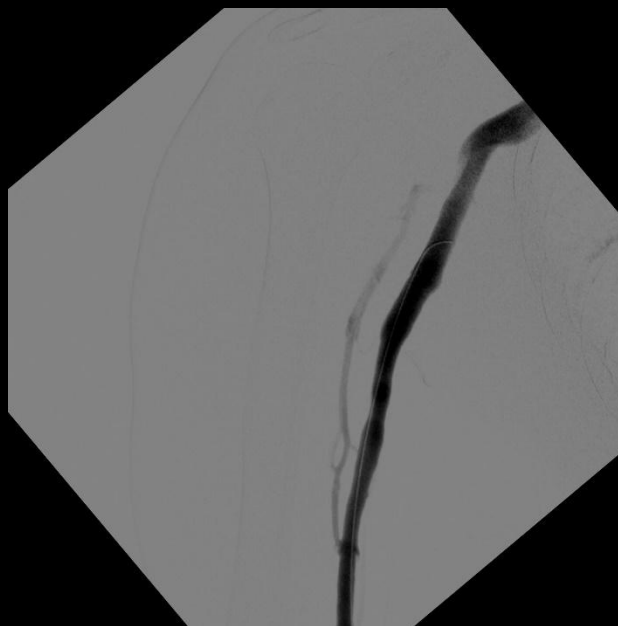
Cine extract
&
Export to mp4

1. Fast DSA acquisition ~ 1.5 seconds
2. Single image acquisition for DSA, Max Peak Opacification and road mapping
3. Easy conversion between DSA and Fluoroscopy image

Digital Subtraction Angiography



Max Peak Opacification



Road map + DSA + Fluoroscopy



EXTRON Usability Concept

Smart Memory Position



Touch OP Console



Drag Collimation



4 Button Wireless Footswitch (Save 14 functions)



Smart Memory Position

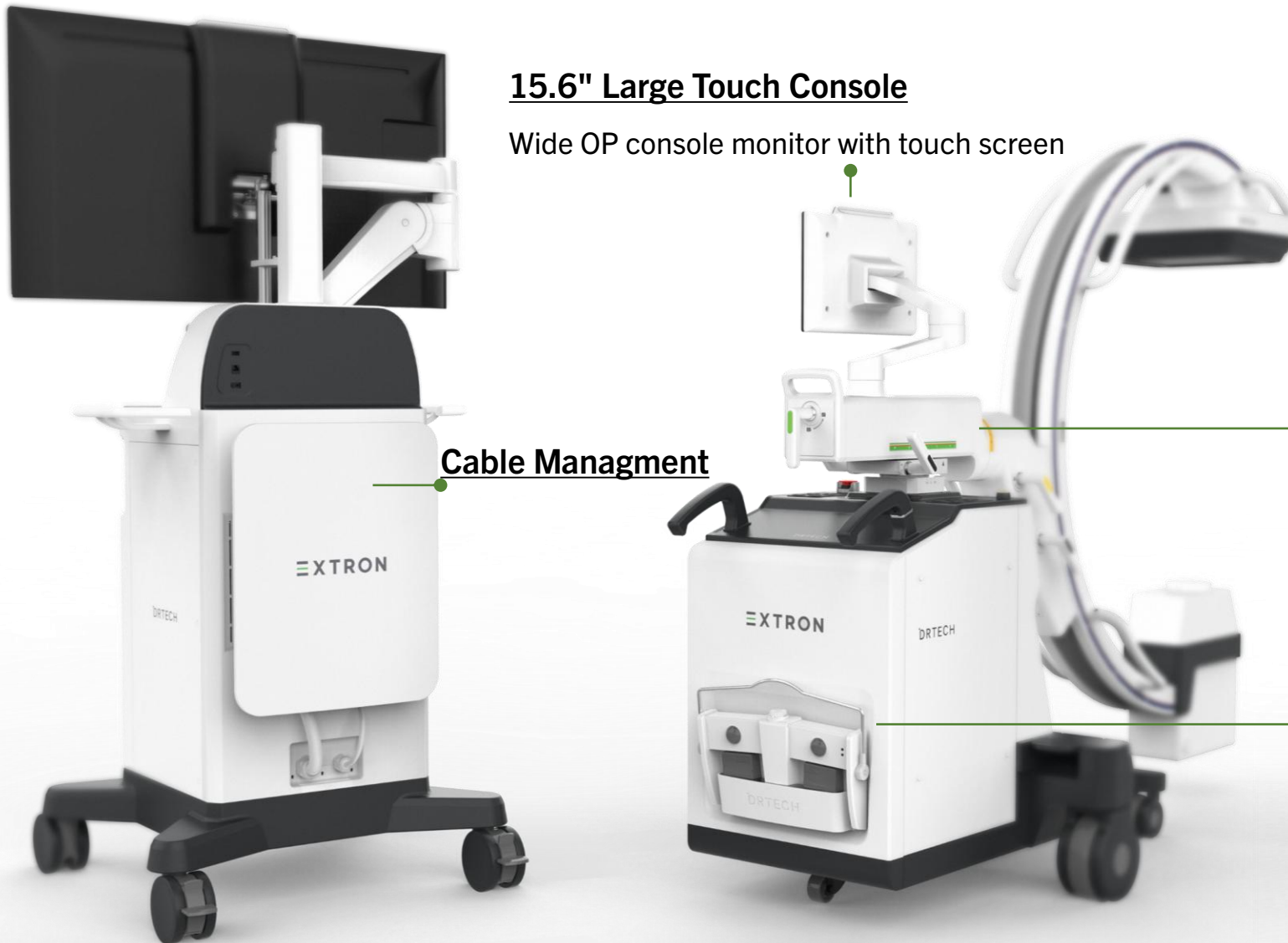
Advanced Digital Positioning Feature for High Usability

Smart Memory Position stores position values for four-axis simultaneously with dose information and image processing information to increase workflow efficiency and imaging accuracy. This also helps to reduce exposure to unnecessary dose as there is no need to reset the exposure condition for the memorized position enabling fast automatic exposure control time (ABC Time).

	Smart Memory Position	A Corp.	B Corp.
Position Information	Digitally recorded	Digitally recorded	Record by hand Attach stickers
Store Parameter value	Store X-ray conditions and image parameters for each position	-	-
Automatic Parameter Switching	Parameter is automatically switched when parameter value matches with the stored position value	-	-



Improved Workflow with User-friendly Design: EXTRON 5/7



15.6" Large Touch Console

Wide OP console monitor with touch screen

Cable Management

Color Matching Brake Handles

Intuitive positioning of the C-arm using color-coded axes and brake handles

Wireless Foot Switch

Wireless 4-foot switch with 15 functions enhances workflow [Option]

Improved Workflow with User-friendly Design: EXTRON 3



43" Wide Monitor

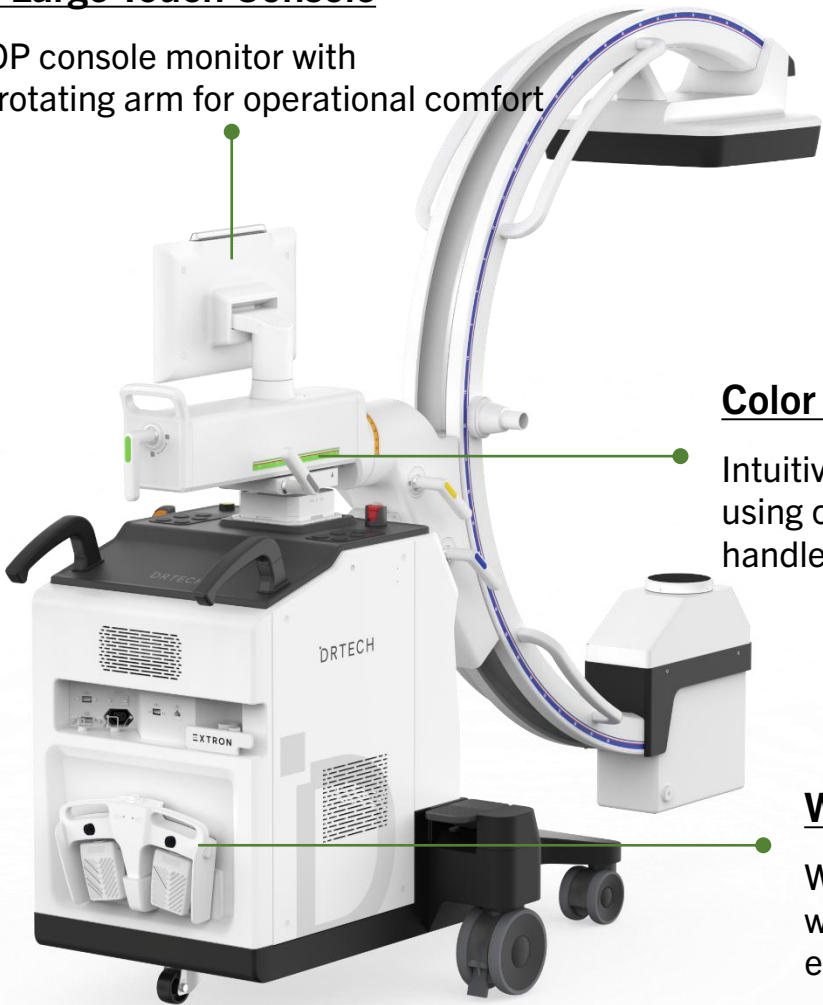
Clear image viewing
*32" monitor cart available

**Light Weight,
Stable & Compact Monitor Cart**

Simple Power & HDMI Connection

15.6" Large Touch Console

Wide OP console monitor with
350° rotating arm for operational comfort



Color Matching Brake Handles

Intuitive positioning of the C-arm
using color-coded axes and brake
handles

Wireless Foot Switch

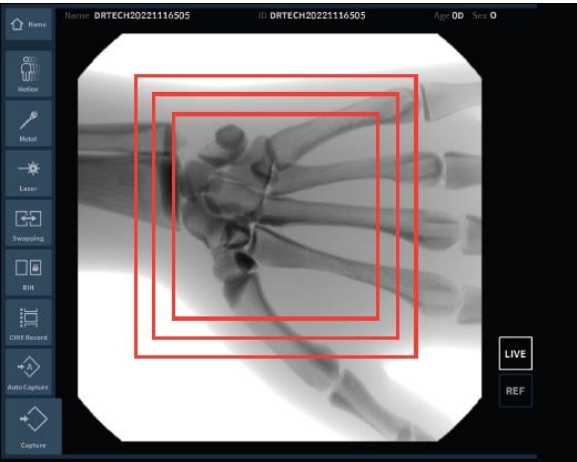
Wireless 4-foot switch
with 14 functions
enhances workflow [Option]

Drag Collimation with Digital Zoom

The dual use of a 4-leaf blade and iris collimator provides sophisticated and accurate collimation, exposing radiation to only user-set areas, reducing unnecessary radiation exposure.

Conventional Collimation

Conventional C-arm systems perform collimation using the button control on the OP console and the desired area can be designated only from the center of the image in a square shape.



Drag Collimation

EXTRON can designate imaging areas from any location and size, simply by touching and dragging the desired imaging location on the OP display. Rest of the area is automatically collimated to prevent unnecessary dose.



Digital Zoom

The designated imaging area is magnified and fitted automatically to the display size. Up to 400%.

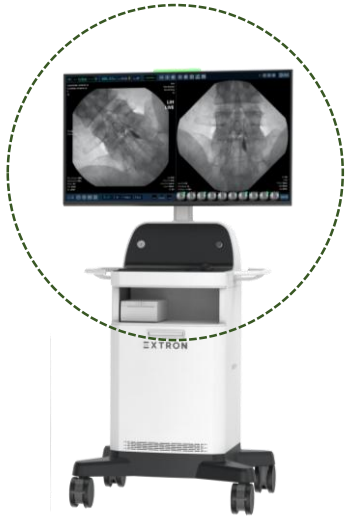


Touch OP Console & Large Monitor Display



15.6' Touch Screen OP Console

Real-time image monitoring available, for both medical staff and radiologists for smooth operation process



Fixed Monitor Arm

*EXTRON 5



43", 31.5" Large Monitor

Easy and fast image monitoring with a wide display



Dual Hinge Articulating Arm Convenient & Free Monitor Movement

360° freely movable monitor arm allows doctors to view images from any angle they need, regardless of location

Wide Free space & Depth

Wider Free space, Orbital Rotation provides convenient and stable surgical environment.



Orbital Rotation

	DRTECH	G	P	Z	S
Free Space	80cm	79cm	77cm	89cm	78cm
Depth	74cm	67cm	73cm	68cm	73cm



Footswitch

Customizable device with 4-button Footswitch, which lets users customize and save their favorite functions

Standard Competitors



2 button Paddle

VS.

EXTRON



4 button Wired Paddle



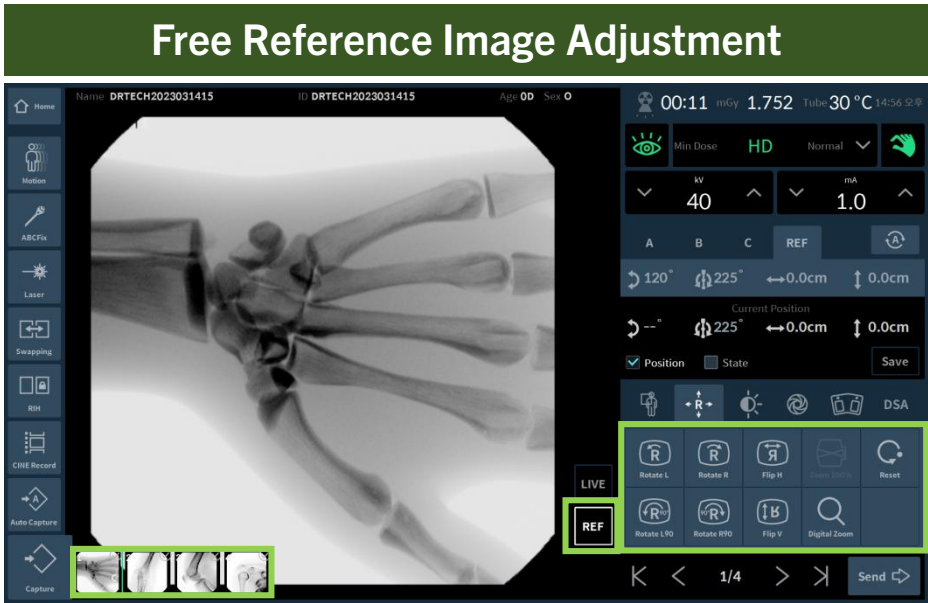
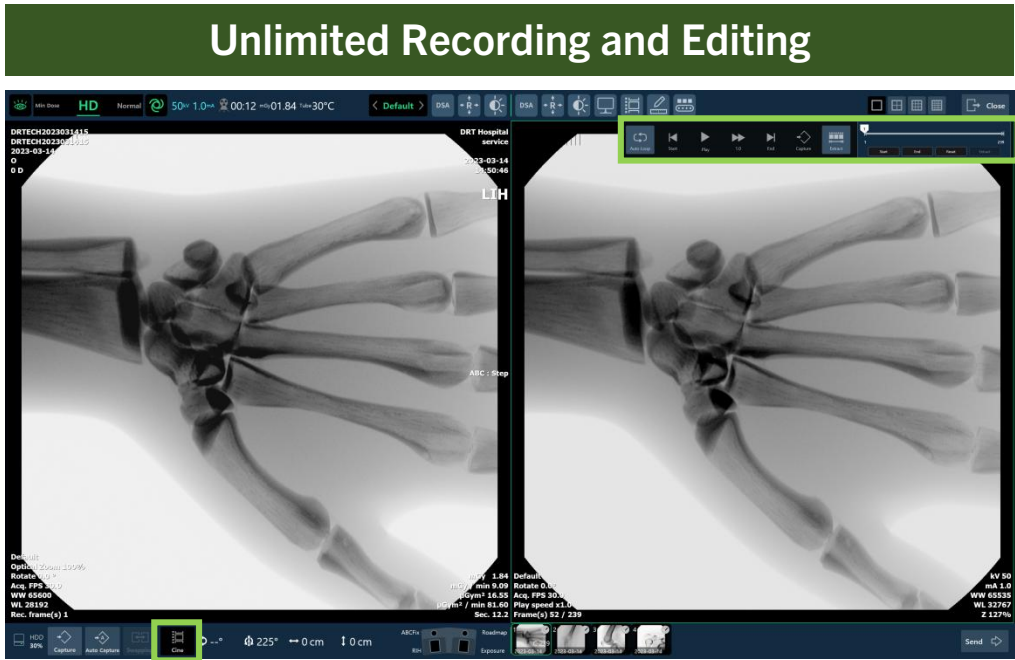
4 button Wireless Paddle

14 Customizable Functions

1	Laser On/Off	8	Motion On/Off
2	Capture	9	ABM
3	Auto Capture	10	Swapping
4	Cine On/Off	11	RIH
5	ABC On/Off	12	X-ray Option Change
6	DSA On/Off	13	X-ray Exposure
7	Roadmap On/Off	14	Needle Enhancement

User Centric UI SW & OP Console

Providing essential user convenience features for an efficient and hassle-free surgical environment



Reinforced Safety

Ensure Surgical Safety against Faulty Devices

Emergency Fluoroscopy

In the event of a main PC failure, the OP console PC takes over the work of the main PC and vice versa. As a result, the surgical procedure can be performed in any environment safely and without any interruptions

Mirroring System [RAID 1st: EXTRON 7 Standard / EXTRON 5 Option]

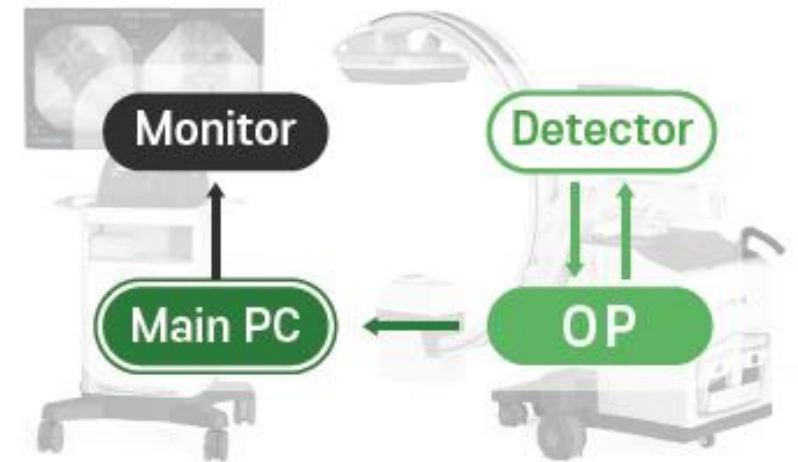
EXTRON uses mirrored 4-hard disks in the PC. Even if a hard disk fails suddenly, the surgery can be performed in a stable manner with the help of another mirror hard disk.

Fast & Easy Recovery

Factory reset can be performed easily and quickly within 7-8 minutes.

Air-Kerma & DAP [Air-Kerma Standard / DAP Option]

Air-Kerma is installed in EXTRON as a default function.
DAP is provided as an option.



Customer Feedback

User Preference by Function/ Performance

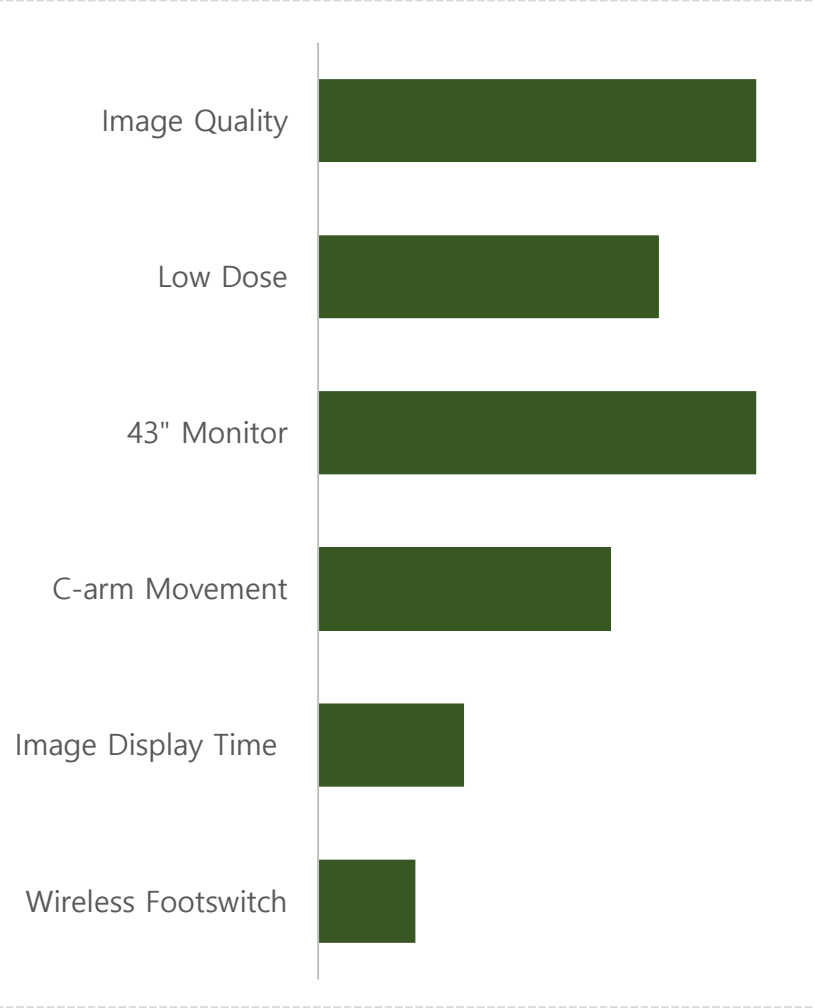
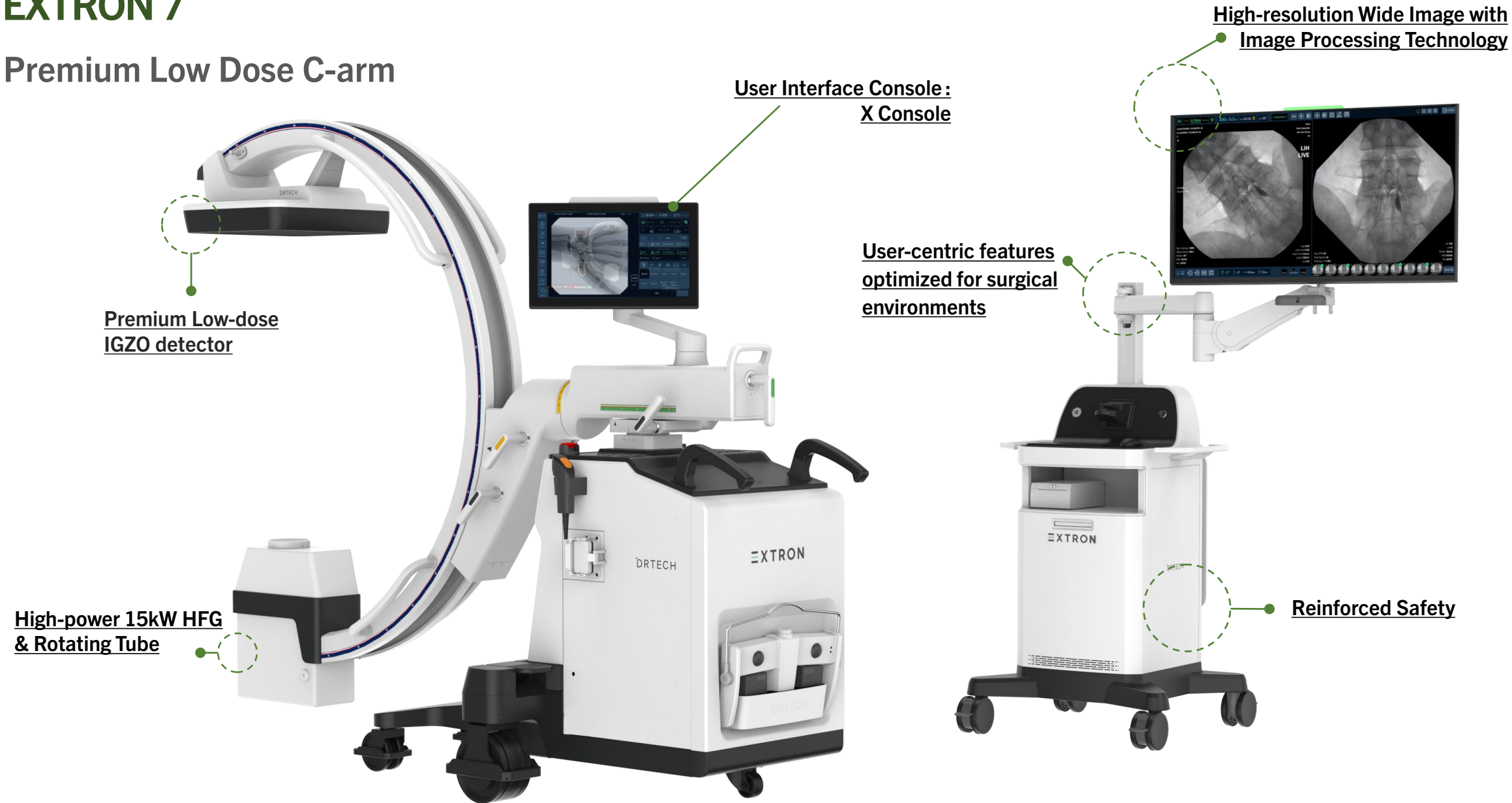


Image Quality	Hanil General Hospital [Orthopedics]	When taking L-spine LAT images, L5-S1 isn't always visible so clearly, but with EXTRON, I could see L5-S1 very clearly with its large monitor and excellent image quality.
	Korea University Hospital [Neurosurgery]	“The quality of the lateral (LAT) images are so good, I believe they could be used as educational material for conferences” “Needle visibility and skin puncture location is very crucial in block and high-frequency treatments. EXTRON’s needle enhancement clearly displays the needle and the puncture area”
	Chungbok University Hospital [Orthopedics]	“I was very satisfied with the image quality”
	Wiltse Memorial Hospital [Orthopedics, Neurosurgery]	“The image quality is excellent compared to Siemens Cios Compact L (I.I), making surgeries easier, and we anticipate that this will also reduce surgery time.”
Low Dose	Kuenhim Hospital [Orthopedics]	“I was amazed just how much dose reduction was possible with the ABM function”
	Chungbok University Hospital [Orthopedics]	Performed Dose comparison Ziehm Vision FD vs. EXTRON EXTRON 52kV/1.7mA (0.03mGy), Vision FD 54kV/11mA (0.56mGy) 18X Less Dose
43” Monitor	Ehwa University Hospital [Orthopedics, Neurosurgery, Urology]	“Large monitor and large image was very convenient”
C-arc Movement	AIN Hospital [Orthopedics]	“Moving the C-arc was very easy compared to our existing C-arm (Siemens Cios Alpha) “
	Hanil General Hospital [Orthopedics]	“Green Laser was very easy and clear to see, and satisfied with the both directional laser”

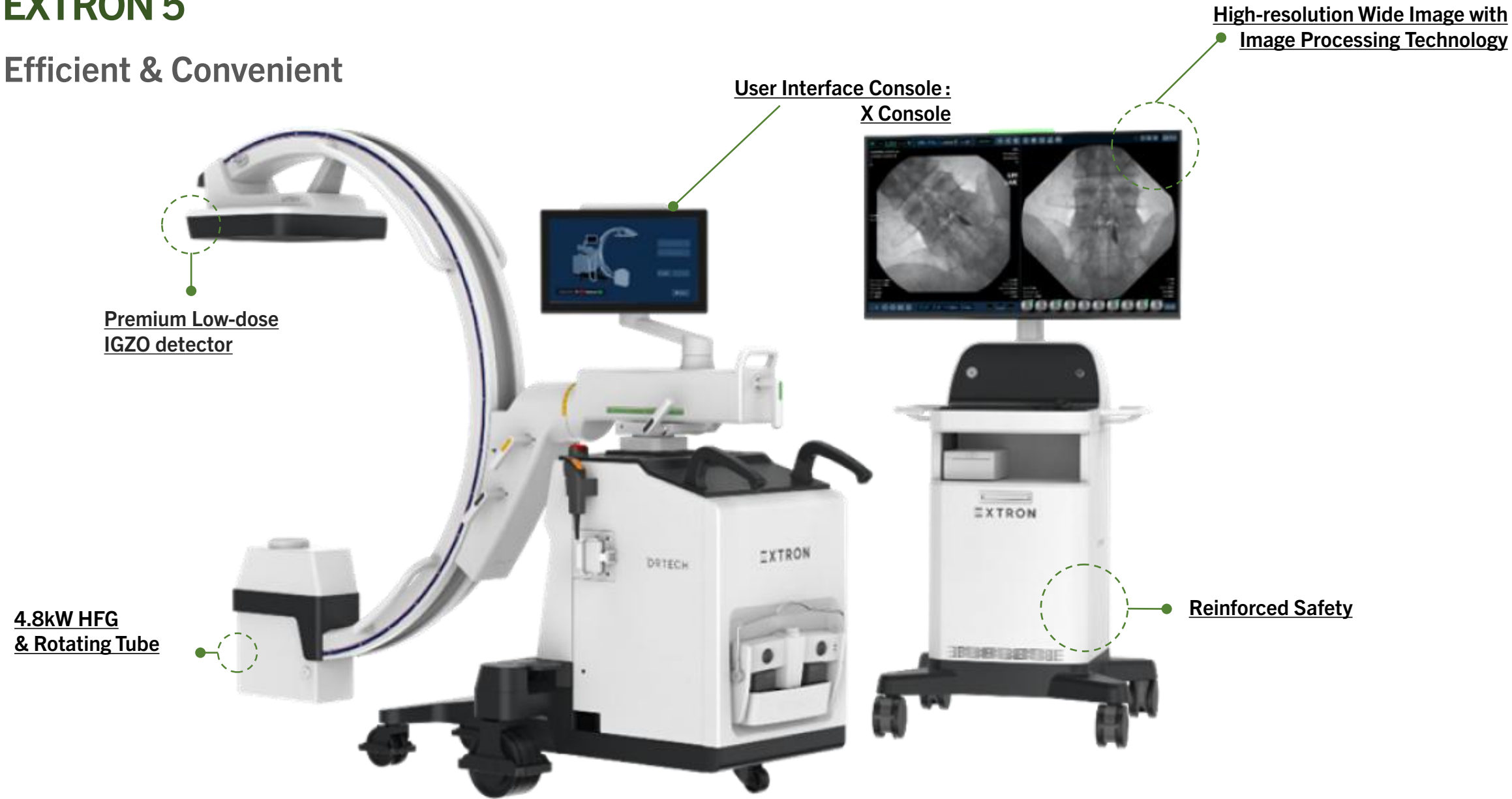
EXTRON 7

Premium Low Dose C-arm



EXTRON 5

Efficient & Convenient



EXTRON 7/5: Technical Specification Summary

Detector		IGZO flat-panel detector
		140µm (21x21) / 148µm (23x23/30x30)
		21cm x 21cm (9" x 9"), 1,504X1,504 23cm x 23xm (9" x 9"), 1,536X1,536 30cm x 30cm (12" x 12"), 2,048X2,048 [23x23 Only available in selected countries]
Capacity	Fluro	0.72kW(120kV *6mA)
	Boost	EXTRON 7: 7.2kW(120kV* 60mA) EXTRON 5 : 4.8kW(120kV* 40mA)
	Radio	EXTRON 7: 15kW (100kV*150mA) EXTRON 5: N/A (Fluoroscopy only)
Anode Heat Capacity		300,000 HU
X-ray Tube		Rotating, 0.3/0.6mm

C-arc	1400ø
Immersion Depth	74 cm (29")
Free Space	80.3 cm (31.6")
Orbital Movement	165°
Monitor	43": 700cd/m ² 31.5": 800cd/m ²
Footswitch	Wired / Wireless 4 button
Power Consumption	220VAC: 16A
	120VAC: 20A
Weight	Main Body EXTRON 5: 284kg Main Body EXTRON 7: 298kg Cart: 141.2kg (42" Monitor)

EXTRON 3

Compact & Versatile Design for Maximum Flexibility

Premium IGZO FPD
based on over 20 years experience

21x21cm (8" x 8")
/ 23x23cm (9" x 9")

Removable Grid
for Low Dose Imaging

Advanced Beam Filtration Technology
for reduced skin entrance dose

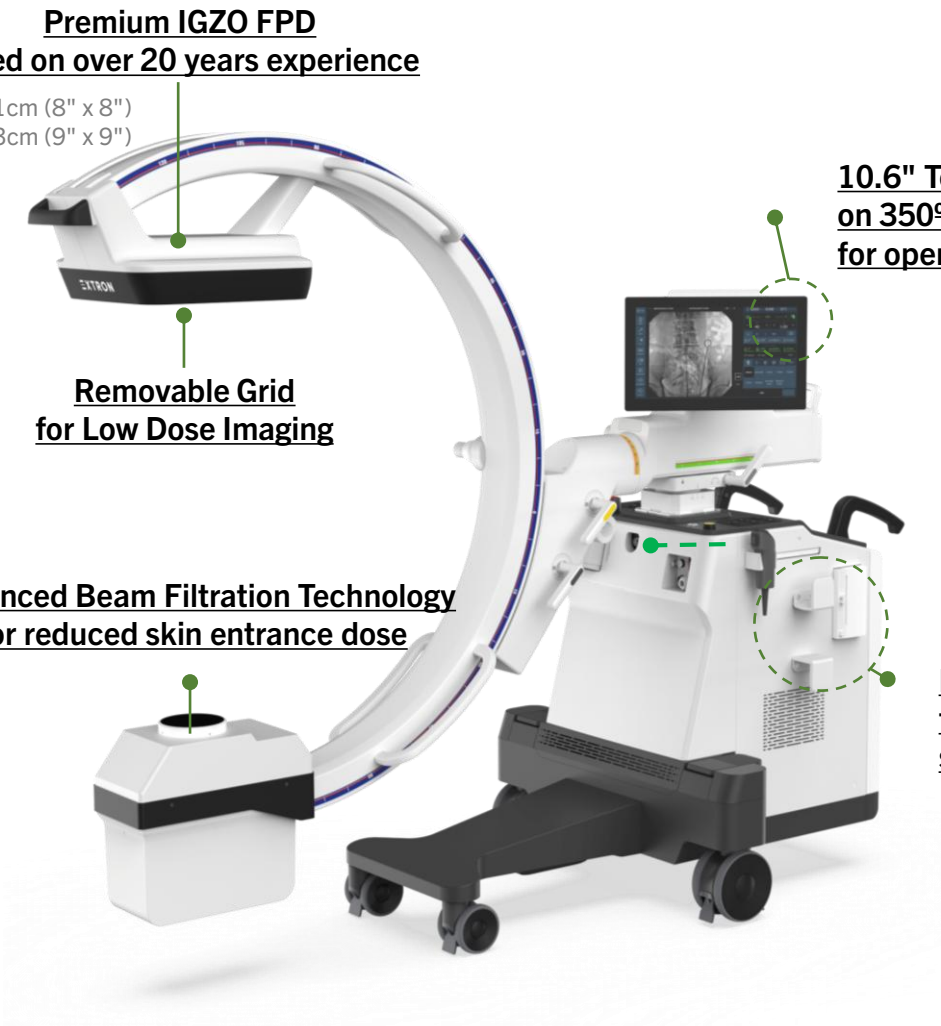
10.6" Touch OP Console
on 350° rotating arm
for operational comfort

Easy Cable Maintenance
for increased safety &
system management

43" Wide Monitor for
clear image viewing

Light Weight, Stable &
Compact Monitor Cart

Simple Power &
HDMI Connection



EXTRON 3 Omni

Compact & Versatile Design for Small Surgery Rooms

Premium IGZO FPD
based on over 20 years experience

21x21cm (8" x 8")
/ 23x23cm (9" x 9")

Removable Grid
for Low Dose Imaging

Advanced Beam Filtration Technology
for reduced skin entrance dose

32" Touch Monitor on
Articulating Arm

10.6" Touch OP Console
on 350° rotating arm
for operational comfort

Easy Cable Maintenance
for increased safety &
system management

210° Rotation



EXTRON 3 & Omni: Technical Specification Summary

Detector		IGZO flat-panel detector
		140μm (21x21) / 148μm (23x23)
		21cm x 21cm (8" x 8"), 1,500X1,500 23cm x 23xm (9" x 9"), 1,536X1,536
Capacity	Fluro	0.6kW(120kV *5mA)
	Boost	3.3kW(110kV* 30mA)
	Radio	5kW (50kV*100mA)
Anode Heat Capacity		74,000 HU
X-ray Tube		Stationary, 0.6/1.2mm

C-arc	1300ø
Immersion Depth	73 cm (28.7")
Free Space	80.3 cm (31.6")
Orbital Movement	165°
Monitor	43" (109.22 cm) : 700cd/m² 32" (81.28cm) Touch Monitor (Option)
Footswitch	Wired 2 button / Wireless 4 button
Power Consumption	220-240VAC 50/60Hz: 10A (cont.)/ 12A
	110-127VAC 50/60Hz: 16A (cont.) / 18A
Weight	Main Body EXTRON 3: 245kg (540.13lb) Main Body EXTRON 3 Omni: 290kg (639.34lb) Monitor Cart: 70kg (154.32lb) (43" Monitor)

Technical Specification

		EXTRON 7	EXTRON 5	EXTRON 3	EXTRON 3 Omni
					
Generator		15kW	4.8kW	5kW	5kW
kV		120KV	120KV	120KV	120 KV
mA	Continuous	6mA	6mA	5mA	5mA
	Boost	60mA	40mA	30mA	30 mA
	Radio.	150mA	N/A	100mA	100 mA
Anode Heat Capacity		300,000 HU	300,000 HU	74,000 HU	74,000 HU
Housing Heat Capacity		1,237,600 HU	1,237,600 HU	1,169,600 HU	1,169,600 HU
Max. Anode Heat Capacity		875W	875W	600W	600W
Tube Type		Rotating	Rotating	Stationary	Stationary
Focal Spot		0.3 / 0.6 mm	0.3 / 0.6 mm	0.6 / 1.2 mm	0.6 / 1.2 mm
Detector	Size	21X21, 23x23, 30x30 IGZO	21X21, 23x23, 30x30 IGZO	21X21, 23x23 IGZO	21x21, 23x23 IGZO
	Resolution & Pixel Pitch	2121(1504X1504) 140um/30fps 2323(1536X1536) 148um/30fps 3030(2048X2048) 148um/25fps	←	←	←

Technical Specification (cont')

		EXTRON 7	EXTRON 5	EXTRON 3	EXTRON 3 Omni
					
Generator		15kW	4.8kW	5kW	5kW
OP Touch Montor		15.6" LCD	15.6" LCD	15.6" LCD	15.6" LCD
OP Touch Arm		Double Hinge	Double Hinge	Single Hinge	Single Hinge
Monitor	Default	43" 4k	43" 4k	43" 4k	32" 4K
	Touch	X	X	X	O
	Option	32" 4K(Medical)	32" 4K(Medical)	-	-
Monitor Arm		Free movement	Free movement	Fixed	Free movement
Laser Localizer		Both Side/ Green	Both Side/ Green	Detector Side / Green	Detector Side / Green
Foot Switch	Wired	-	Default (4Foot)	Default (2Foot)	Default (2Foot)
	Wireless	Default (4Foot)	Option (4Foot)	Option (4Foot)	Option (4Foot)
Collimator	Iris	●	●	Option	Option
	Leaf	4 Leaf (Independent)	4 Leaf (Independent)	4 Leaf (Independent)	4 Leaf (Independent)
Memory Position		●	●	Option	Option
DAP		Option	Option	Option	Option
Angiography		Option	Option	Option	Option

Thank You