

## In-line 3D CT AXI System

# X-eye 6300NTI

### Key Factor 1

### Ultra-high Resolution Image

- Oblique CT method at 70° degree tilt
- Capable to inspect down to Min. 50um(diameter) uBump
- Unique Hybrid Open Tube with 0.8um focal spot size

### Key Factor 2

### High speed 2D & 3DCT inspection

- 3.5 sec/FOV(Field of View), FOV Min. 28mm x 28mm, Max. 75mm x 75mm
- 9.6Mp detector with large FOV for 2D and 3DCT inspection

### Key Factor 3

### High Accuracy & Reliability

- High precision mechanism & Image processing by volumetric void calculation
- No image sag by pulsed X-ray in 360° rotation
- Barrel fill inspection by volume

### Key Factor 4

### High Cost benefit & Radiation damage avoid

- Unique Hybrid Open Tube with long life span of filament & Target
- Radiation damage avoid by pulsed X-ray & Filter technology

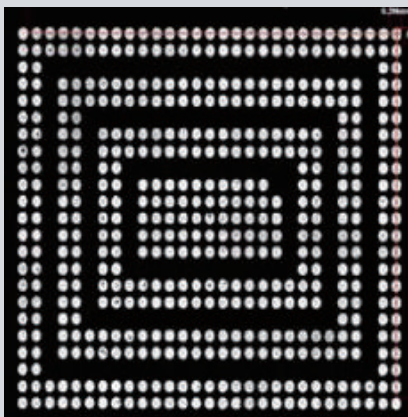


## AUTOMATIC X-RAY INSPECTION APPARATUS FOR SMT INLINE PROCESS

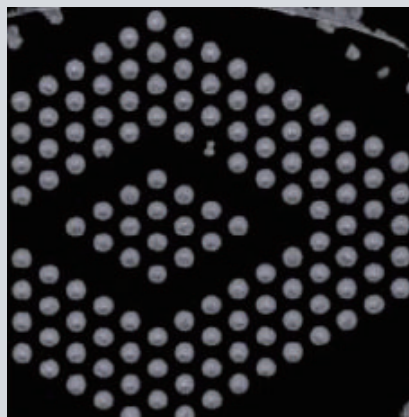
United States Patent  
US010330611B2

Patent Registered in 5 Countries Including USA

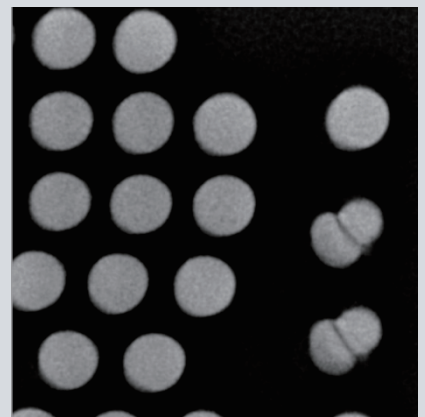
## High-Quality Images



Missing defects



Non-wet defects

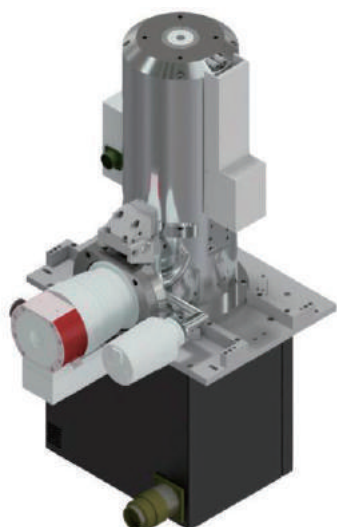


HIP(Head In Pillow) defects

## Advanced technology of X-ray Tube

### Hybrid tube

Hybrid Open Tube, developed by SEC Co., Ltd is installed in X-eye 6300NTI which enables high magnification and defect detection in size of 50 $\mu$ m.



#### 1 Closed reflection type tube

##### Strength

Suitable for in-line AXI with long life-time.(10,000hr)

##### Weakness

It is structurally difficult to deliver high magnification. Since the minimum focal spot is 3 $\mu$ m, it is difficult to detect defects of less than 200 $\mu$ m in the 3D AXI system.

#### 2 Open transmission type tube

##### Strength

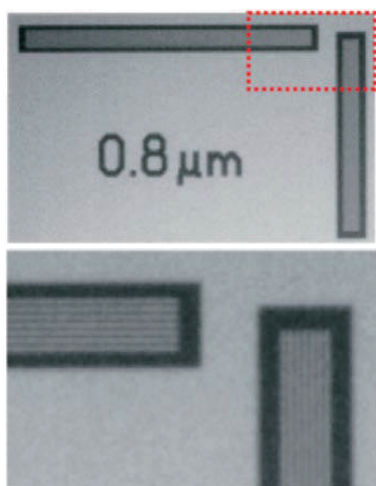
It is structurally possible to deliver high magnification Minimum focal spot is less than 1 $\mu$ m, and defect detection of 50 $\mu$ m is possible in 3D AXI system.

##### Weakness

Normal running time is below 500hr so it is not suitable to be used in in-line AXI system.

#### 3 Hybrid tube

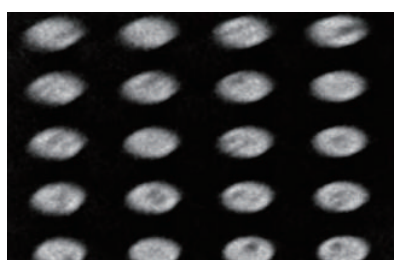
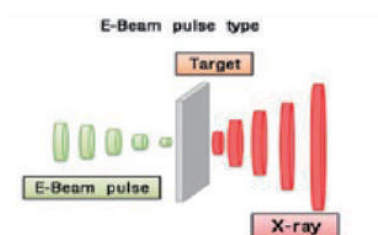
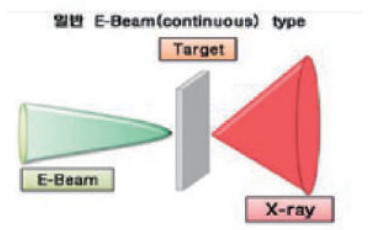
SEC developed a long life time of 5,000hrs tube as an open transmission type structure which is installed in In-line AXI system and can detect defects of 50 $\mu$ m.



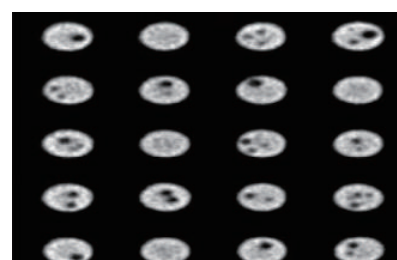
### Pulsed X-ray

World class pulsed X-ray of Hybrid Open Tube is developed by SEC Co., Ltd for Ultra high speed 3D CT. High quality images can be acquired in high speed rotation without image dragging.

Comparison of images quality under the same inspection condition



Normal X-ray – image sag occurrence



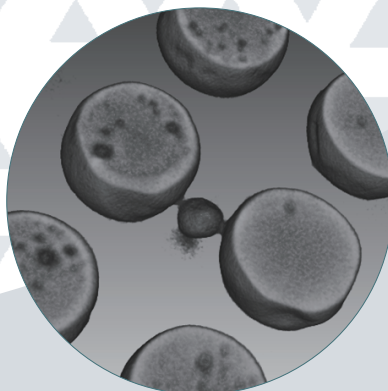
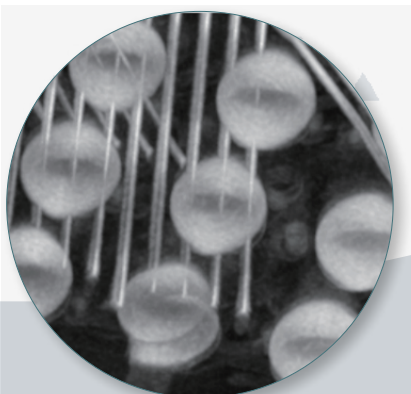
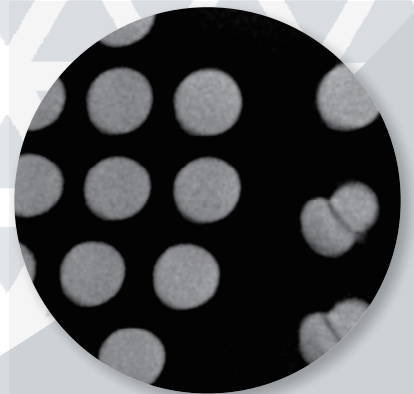
Pulsed X-ray – No image sag



**sec**  
e-beam pioneer

# X-eye 6300NTI

Ultra high resolution  
In-line 3D CT AXI System



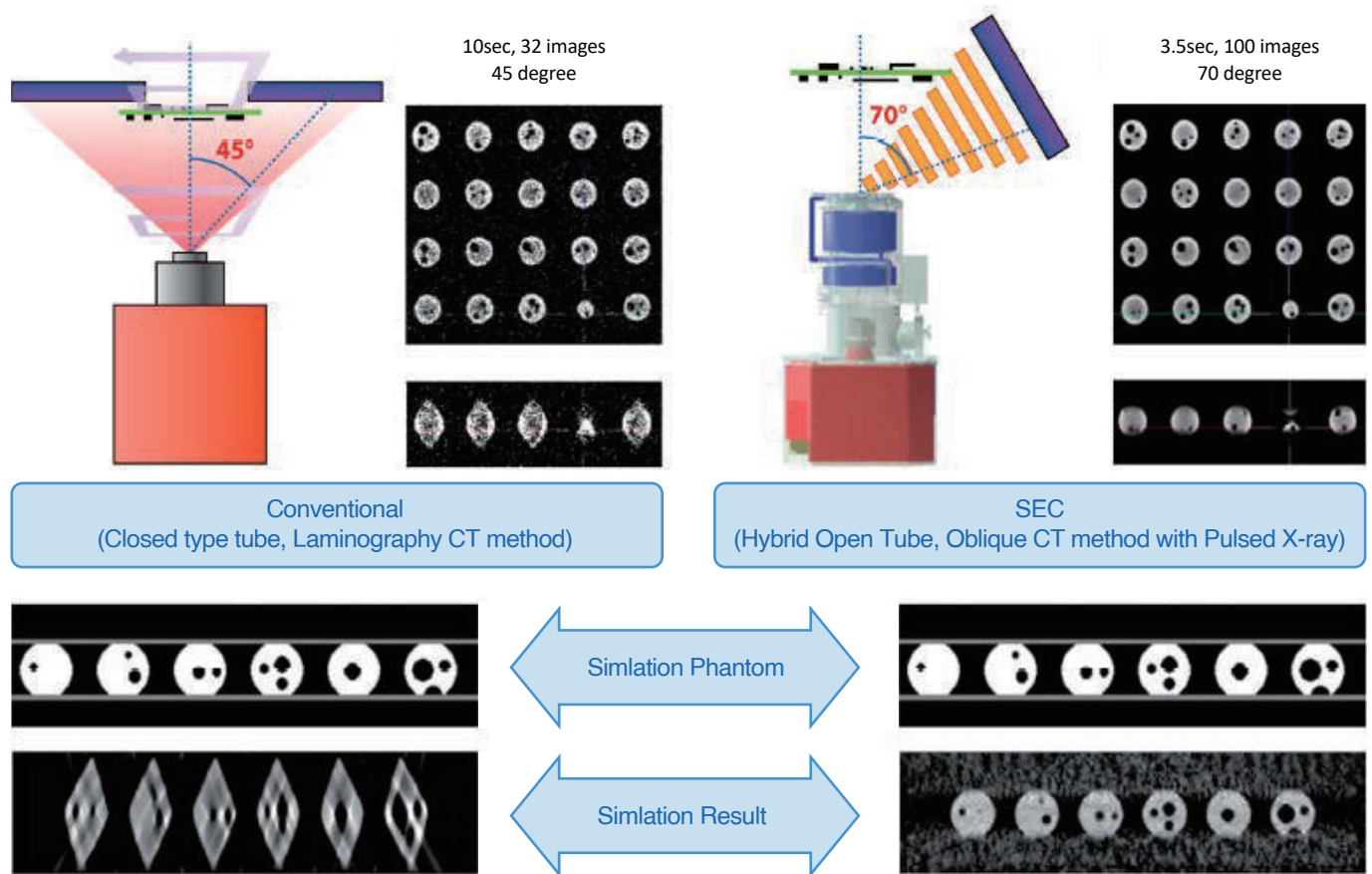
## High image quality of X-eye 6300NTI

# High speed Oblique CT

Oblique CT can scan high-quality CT images with less distortion by high tilted angle compared to other CT methods and acquire more projections.

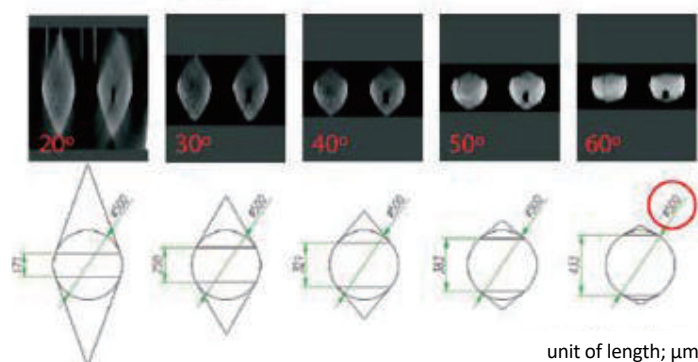
Due to long time reconstruction, Oblique CT method is not suitable for 3D AXI.

X-eye 6300NTI can scan at high speed with Oblique CT method due to pulsed X-ray, developed by SEC Co., Ltd. and reduce the reconstruction time with parallel GPU calculation

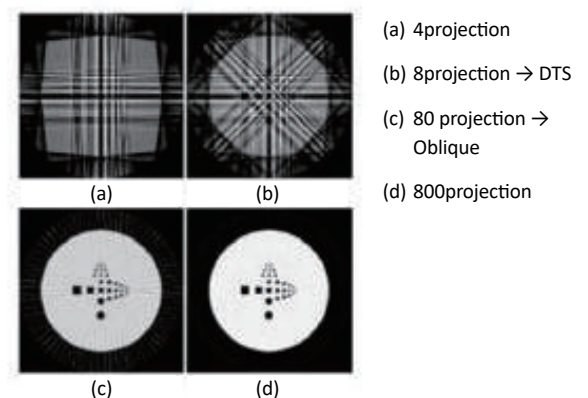


## CT Image Comparison principle

### Limited Angle Artifacts



### Projection numbers







## South Korea - Headquarters

## U.S - North America Office

## Europe - Dresden Office

### China - Shanghai quarters

## Vietnam - Office

## Applied Customized Damage Free Technology

# Dosage X-ray damage free

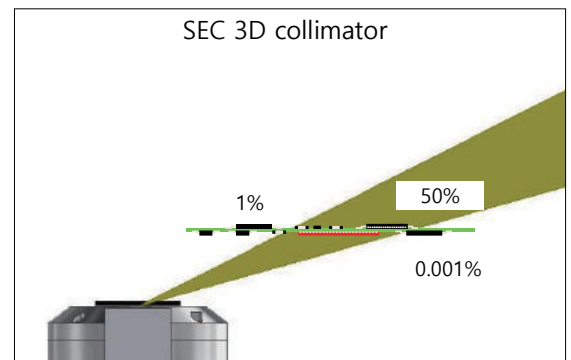
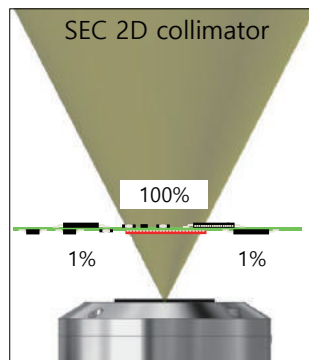
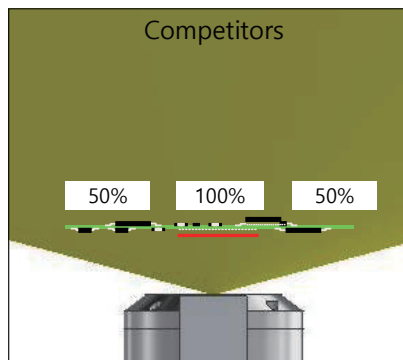
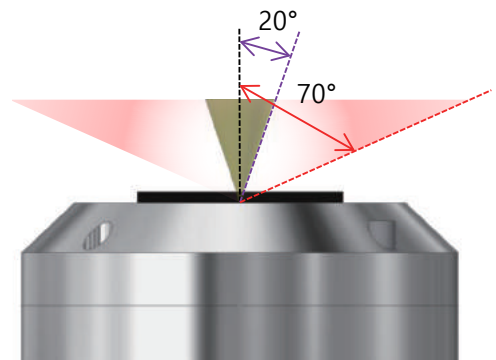


**Pulsed X-ray + SEC filter & Collimator + Searching best X-ray condition**

## Introduce of 2D, 3D Collimator

X-rays are generated up to angle of 70 degrees. However, Detectors only need X-rays within 20 degrees, and X-rays above 20 degrees are unnecessary doses.

Our collimator is used to reduce damage to semiconductor by removing these.

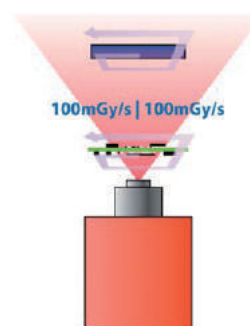


[ Dose ratio by position according to collimator, Red area is inspection chip ]

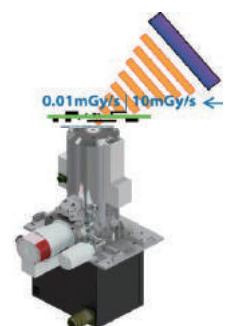
## Introduction of SEC filter

The SEC filter developed by our know-how has excellent performance.

In case of X-ray inspection, Semiconductors could be damaged. However, Not only the SEC filter effectively reduces radiation damage, but also it has no magnification loss because of a its thickness less than 0.5mm.



Competitors - Damageable



SEC - No Damage  
(Pulsed X-ray + SEC filter + Collimator)

# Applied Technology Applications

## Automotive



### Component

- ADAS board
- ECU
- LED board
- IGBT
- Battery

## Smart Device



### Component

- DRAM
- Communication Module(4G/5G)
- Mobile battery
- AP
- Camera Module

## More details about our products

Watch the video for application examples.



Guidance of the demonstration room



Product

Specifications

List	Specification
X-ray tube	Hybrid Open Tube 160kV / 500μA / 80W Min. Focal spot 0.8μm
CT Inspection	Oblique CT Table size Min. 50 x 50, Max. 330 x 250 (mm) Min. CT Scan time 4.5sec/FOV
Detector	Resolution 9.6M Pixel FPD Frame rate 30 FPS
System	Dimensions 1,480(W) x 2,270(D) x 2,050(H) (mm) Weight 4,200 kg
Defect Item	Short, Bridging, Open, Void, Solder Extrusion

Product

Dimension

