TELEDYNE DALSA
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# XINEOS

## Dynamic CMOS X-Ray Flat Detectors for Medical Radiology

# **Xineos** - CMOS Flat X-Ray Detectors

## IMPROVED MEDICAL DIAGNOSTIC AT A FRACTION OF THE DOSE

Teledyne DALSA Xineos offers a complete portfolio of CMOS flat X-Ray detectors tailored specifically to meet the demanding needs of dynamic diagnostic and interventional medical applications service, support and manufacturing.

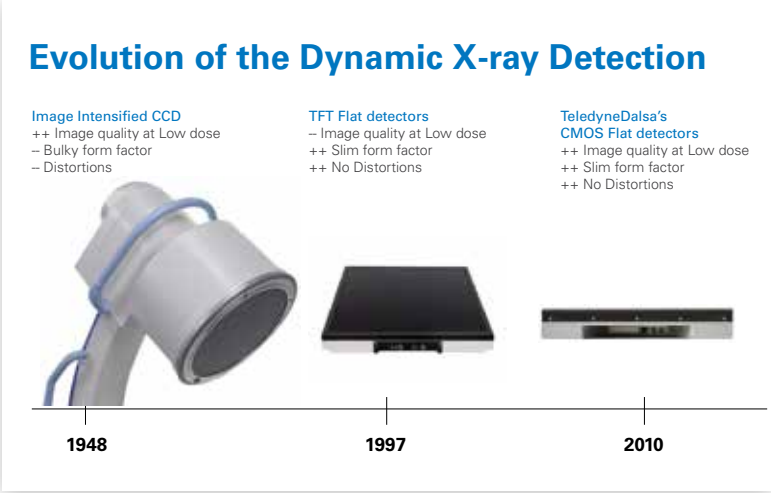
- Surgery
- Cardio-Vascular
- Angio
- Gastro-intestinal Fluoroscopy
- Lithotripsy
- Orthopedics
- 3D reconstruction

## CONVENIENT SQUARE FIELD-OF-VIEW – NEXT GENERATION X-RAY TECHNOLOGY

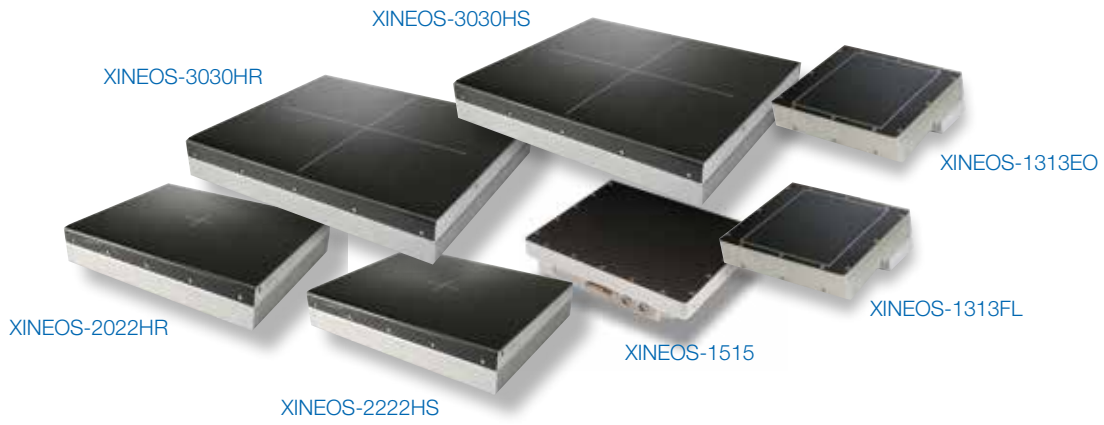
The Xineos flat detector family spans the popular square field-of-view dimensions.

- 13x13cm$^2$
- 15x15cm$^2$
- 22x22cm$^2$
- 30x30cm$^2$

Replaces the incumbent technology Image Intensified CCD (IICCD) systems with circular diameter of 6", 9" or 12".



# **Xineos** – Family of Interventional CMOS Detectors




## EASY TO DEPLOY – VERSATILE FUNCTIONALITY

- Built-in real time image pre-processing
- Connector bay
- Slim and elegant design
- EMC resistant
- Switchable saturation dose
- Seamless and instant readout mode switching
- Gain independent of pixel binning mode
- Low weight
- Flexible zoom modes
- Low weight
- CE and UL certifications
- Choice of standard Data Interface types

XINEOS-2022HR Camera Link

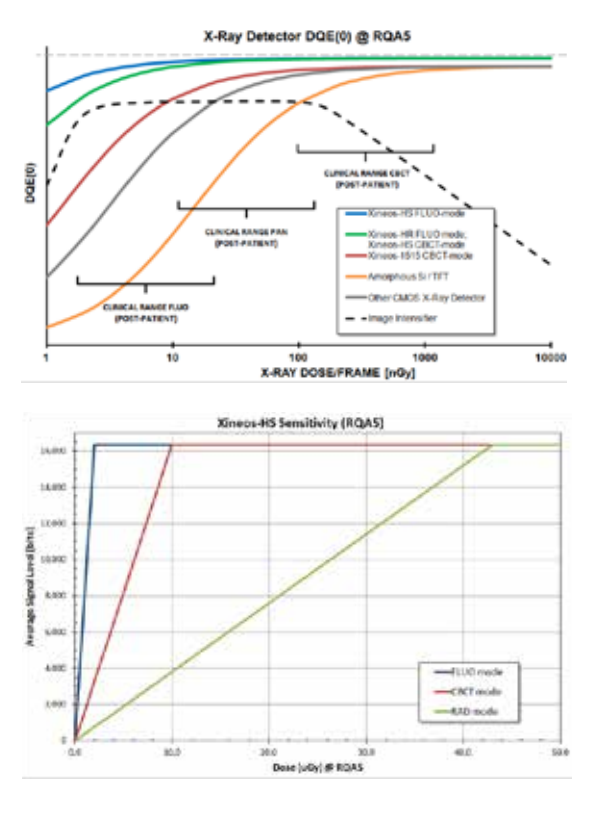
XINEOS-2222HS GigE

XINEOS-3030HR Camera Link

XINEOS-3030HS GigE

# **Xineos** – True New Digital X-ray Advancements

The Xineos family of CMOS X-Ray detectors is the first commercially available detectors that combine the low dose image quality (IQ) of the IICCDs and the multiple advantages of amorphous-silicon (aSi) flat detectors, including a slim form factor, no geometric distortions, and a larger field-of-view (FOV).




## • LOW DOSE AND HIGH IQ AT WIDE DOSE SPECTRUM

The Xineos Family of medical detectors features the highest Detective Quantum Efficiency (DQE) at very low dose levels, surpassing the previous 'golden standard' image quality performance of IICCDs. The very low noise of the CMOS material and the proprietary active pixel architecture of Teledyne DALSA's CMOS detectors assure superior signal-to-noise ratio (SNR) at low dose levels compared to a-Si-based and even other CMOS-based competitors.

## • HIGH DYNAMIC RANGE

Utilizing the sixth- generation proprietary radiation-hard active pixel design with selectable pixel saturation charge capacitors, the Xineos detectors are extremely versatile and suitable for all types of interventional applications using just a single detector. Those detectors can seamlessly change from high sensitivity to high dynamic range modes, without compromising on IQ or patient dose, and without elaborate and time consuming calibration routines.

## • REAL-TIME IMAGING AT FULL RESOLUTION AND FULL FIELD-OF-VIEW

Enabled by high speed CMOS integrated circuits, the Xineos family of dynamic X-ray detectors sets the industry benchmark for speed at full resolution and at full field-of-view (FOV). All detectors of the family support 30fps at full resolution and full FOV, while Xineos-2222HS and Xineos-3030HS are even able to run at 60fps at full resolution and full FOV. The images of the Xineos detectors are always lag- and artifact-free, due to the high electron mobility of the crystalline silicon material, which is not the case when using any other X-Ray imaging technology.

# Improved Return on Investments

## • HIGH RESOLUTION

High spatial resolution is achieved in the Xineos family of detectors, offering a small pixel pitch of 100µm across all FOV models. Teledyne DALSA's advanced active pixel design is responsible for the very high 85% pixel fill factor, even at such small pixel sizes. The small pixel pitch together with a proprietary scintillator assembly process also contributes to high MTF performance of the detectors.

## • LOW DISSIPATION POWER

The high level of component integration and the low resistivity of the crystalline CMOS material in the Xineos family detectors contribute to the very low power dissipation, which makes any kind of active cooling in the medical systems obsolete. This saves high running and maintenance costs for expensive liquid cooling systems, as well as improves up-time and reliability of critical imaging equipment.

## • INSTANT START-UP TIME AND STABLE OPERATION

The extremely low dark current of the Xineos detector family is responsible for a very stable operation of the detectors right from the start, where the effects of system warming up does not influence the operation of the detector. Teledyne DALSA's detectors are fully operationally running 30 seconds after switching on the power, typically faster than the system host boot time.

## • LONG LIFETIME AND COST REDUCTION

The Xineos detector family utilizes a large integration level of discrete peripheral electronic components into the pixel array. This drastically reduces the number of components and interconnects, which in turn reduces the detector cost and the assembly complexity while at the same time improving the product reliability. The proprietary active pixel of the Xineos detector family is radiation-hard by design, meaning that it is resistant to performance degradation caused by X-Ray radiation. This enables long operating lifetime and less frequent calibration routines.

# Improved Patient Care, Optimized Diagnostics Simplified Deployment

## RADIOLOGISTS

- High image quality at very low dose – lower dose for patient and staff, higher success rate of procedures, higher patient throughput
- System operational at under 30 seconds – immediate start of the system – higher success rate of emergency procedures
- Reliable and stable detector operation – no calibration routines and loss of time, higher throughput
- Seamless mode switching – no loss of time, easy system operation

## HOSPITAL ADMINISTRATORS

- High image quality at very low dose –
    - physicians can run more procedures for the same dose quote per annum
    - better hospital positioning due to higher success rate of procedures
    - better ROI thanks to higher patient throughput
- Reliable and stable detector operation – no calibration, satisfied physicians, faster procedures
- Seamless mode switching – more and faster procedures
- Total cost of ownership minimization – longer detector lifetime, less service costs for the system

## ORIGINAL EQUIPMENT MANUFACTURES

- Added value to the system due to:
    - Excellent IQ at low dose performance
    - Superior spatial resolution
    - Faster start up time
    - Seamless mode switching
- Faster and easier detector integration
    - Built-in real-time image preprocessing, no external box
    - No active cooling required
- Reliable systems, less maintenance, fewer support calls
- Possibilities for new applications due to high speed capabilities
- Aftersales support

# XINEOS
## FAMILY DATA SPECIFICATIONS

| PARAMETER | UNIT | XINEOS-1313FL | XINEOS-1313EO | XINEOS-1515 | XINEOS-2022HR | XINEOS-2222HS | XINEOS-3030HR | XINEOS-3030HS |
|---|---|---|---|---|---|---|---|---|
| **GENERAL** | | | | | | | | |
| TECHNOLOGY | | CMOS Active Pixel | CMOS Active Pixel | CMOS Active Pixel | CMOS Active Pixel | CMOS Active Pixel | CMOS Active Pixel | CMOS Active Pixel |
| PIXEL PITCH | [um] | 100.1 | 100.1 | 99 | 99 | 151.8 | 99 | 151.8 |
| PIXEL CAPACITY MODES | [#] | 1 | 1 | 2 | 2 | 3 | 2 | 3 |
| ACTIVE AREA | [mm] | 131x131 | 131x131 | 153x153 | 206x224 | 215x215 | 296x296 | 296x296 |
| RESOLUTION | [pxl] | 1316x1312 | 1316x1312 | 1548x1548 | 2064x2236 | 1416x1420 | 2996x2996 | 1952x1952 |
| **IMAGE QUALITY** | | | | | | | | |
| SATURATION DOSE, RQA5 (per mode) | [uGy] | 2 | 9 | 3 / 14 | 5 / 24 | 2 / 10 / 43 | 5 / 24 | 2 / 10 / 43 |
| MTF @ 1LP/MM | [%] | 60% | 60% | 60% | 60% | 60% | 60% | 60% |
| DQE @ 0LP/MM, RQA5 | [%] | 70% | 70% | 70% | 70% | 70% | 70% | 70% |
| RANDOM NOISE (HFW) | [DN] | 6 | 4 | 5 / 3 | 5 / 3 | 5 / 3 / 2.5 | 5 / 3 | 5 / 3 / 2.5 |
| DYNAMIC RANGE (HFW) | [dB] | 69 | 72 | 71 / 74 | 71 / 74 | 70 / 75 / 77 | 71 / 74 | 70 / 75 / 77 |
| IMAGE LAG, FIRST FRAME @ 30fps | [%] | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% |
| **BANDWIDTH** | | | | | | | | |
| DATA INTERFACE | [-] | GigE / CameraLink | GigE / CameraLink | GigE / CameraLink | GigE / CameraLink | GigE / CameraLink | GigE / CameraLink | GigE / CameraLink |
| ADC CONVERSION | [bits] | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| FRAME RATE - 1x1 (CamLink) | [fps] | 45 | 45 | 30 | 30 | 90 | 30 | 90 |
| FRAME RATE - 2x2 (CamLink) | [fps] | 90 | 90 | 21 | 60 | 150 | 60 | 150 |
| FRAME RATE - 1x1 (GigE) | [fps] | 30 | 30 | 60 | 12 | 27 | 6 | 14 |
| FRAME RATE - 2x2 (GigE) | [fps] | 90 | 90 | 60 | 48 | 100 | 24 | 55 |
| **POWER CONSUMPTION** | | | | | | | | |
| POWER SUPPLY | [Vdc] | 12 | 12 | 11..26 | 11..26 | 11..26 | 11..26 | 11..26 |
| POWER CONSUMPTION | [W] | 11 | 11 | 8 | 15 | 15 | 18 | 18 |
| ACTIVE COOLING | [-] | NO | NO | NO | NO | NO | NO | NO |
| **INTERGRATION** | | | | | | | | |
| FOOTPRINT (WxH) | [mm] | 188x150 | 188x150 | 224x176 | 292x237 | 292x235 | 377x329 | 377x327 |
| THICKNESS (IN/OUTSIDE IO) | [mm] | 58 / 35 | 58 / 35 | 45 / 36 | 50 | 48 | 50 | 48 |
| WEIGHT | [kg] | 2.5 | 2.5 | 3.0 | 5 | 5 | 8 | 8 |
| EXTERNAL INTERFACE MODULE | [Y/N] | NO | NO | NO | NO | NO | NO | NO |
| **ENVIRONMENTAL** | | | | | | | | |
| CERTIFICATION | | - | - | CE/UL | CE/UL | CE/UL | CE/UL | CE/UL |
| EMC (IEC 60601-1-2) | | CLASS B | CLASS B | CLASS B | CLASS B | CLASS B | CLASS B | CLASS B |

TELEDYNE DALSA
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# World-Class Capability...
# Design, Engineering and Manufacture

## LEADING PROVIDER AND PREFERRED PARTNER

Image Sensor Product Solutions in Professional- and Mid-Range segments

- Human Vision
- Medical/Dental X-Ray
- Non-Destructive Testing
- Industrial & Scientific X-Ray

## IMAGING HERITAGE OF 35+ YEARS

Design, Development & Manufacturing of

- CCD & CMOS Image Sensors
- X-Ray Detectors
- Chipset & Application Reference Designs
- Customer Application Support

## A QUALITY CERTIFIED COMPANY

- ISO 9001-2008
- ISO 13485
- ISO 14971
- IEC 60601-1 3rd edition
- UL & CE certification
- RoHS compliancy


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