

Proposal for supplying a customized  
**AXIS-SXR-60-STD**  
**36 Mpix 10 $\mu$ m sCMOS Soft X-ray Camera**

Prepared for:

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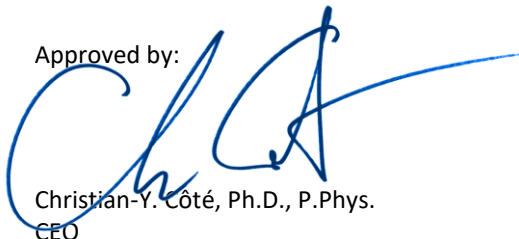
by:



1650 boul. Lionel-Boulet, Varennes, Québec, Canada J3X 1S2

[www.axis-photon.com](http://www.axis-photon.com)

Approved by:



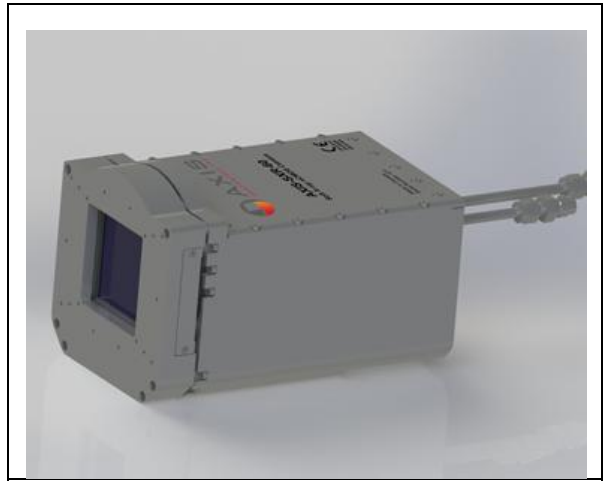
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CEO  
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## 1. PROPOSED SYSTEM

AXIS-SXR-60 is a new sCMOS camera for measurements of soft x-rays from 20 eV to 2 keV. This camera is an improved version of the AXIS-SXR developed and characterized by the detector group and SEXTANTS team of SOLEIL Synchrotron<sup>1</sup>.

AXIS-SXRF-60 camera is based on a new 36 Mpix backside illuminated scientific CMOS (BSI-sCMOS) which is able to acquire low noise images with a frame rate up to 26 Hz. It is high vacuum compatible and it comes with all the required cables and frame grabber.



Note: image is for information only; end product may be slightly different.

Dimensions:

13 x 14 x 24 cm

W x H x D (excluding water connectors)

We offer 3 sensor grades:

- Grade 1 (Defects: < 1200 pixel; < 6 columns or rows)
- Grade 2 (Defects: < 2000 pixel; < 10 columns or rows)
- Engineering

As for software, a generic control application with an SDK is provided.

Note: Documentation concerning the SDKs (Linux or Windows) is available upon request

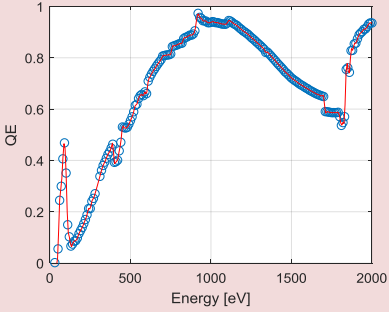
Weight	5 kg
Camera cooling	T < -25°C ; water cooling
Vacuum compatibility	down to $7 \times 10^{-7}$ mbar, at least.

<sup>1</sup> "Characterization of a back-illuminated CMOS Camera for soft x-ray coherent scattering"

K. Desjardins, H. Popescu, P. Mercère, C. Menneglier, R. Gaudemer, K. Thânell, N. Jaouen. AIP Conference Proceedings 2054, 060066 (2019); <https://doi.org/10.1063/1.5084697>, Published Online: 16 January 2019



## 2. HARDWARE FEATURES

Specifications	AXIS-SXRF-6060
Sensor Type	GPIXEL GSENSE 6060BSI <b>GRADE 1</b>
Size	6144 x 6144 (10 μm)
Area	61.4 x 61.4 mm
Energy detection range:	100 – 2000 eV
Expected QE	<p><b>Measured Quantum Efficiency</b><sup>1</sup></p>  <p>K. Desjardins et al. <a href="#">J. Synchrotron Rad. 27 (2020)</a></p>
Readout Mode	Rolling shutter
Frame Rate	26fps @ 12-bit STD 11 fps @ 12-bit HDR 8 fps @ 14-bit STD
Full Well capacity	100 ke- (STD Mode) 80 ke- (HDR Mode)
Readout noise	<3 e- (RMS)
Dark current	<0.25 e-/p/s (@ -25 °C)

Specifications	AXIS-SXRF-6060
Photo response non-uniformity:	0.2%
Dynamic range:	31 600 (90dB)
Vacuum compatibility	5 x 10 <sup>-7</sup> mbar
Vacuum flange	DN200CF
Cooling	Water

Data Acquisition	AXIS-SXRF-6060
Electrical Interface	CoaxPress 4x 6Gbps
Required Acquisition Card	CoaxPress PCIe card

Software	AXIS-SXRF-V2
SDK	Yes
Application	Standalone application





**C. Duplex optical cable (outside the chamber) :**

This cable carries the USB3 optical signal. It is a standard OM3 duplex cable with LC connectors at one end and ST connectors at the other end.

Length = 3 m

**D. 1- Optical converter**

Converts the CoaXPress signal to optical. Powered from the frame grabber.

**2- CoaXPress Frame Grabber**

The frame grabber card is fitted with 4 CoaXPress links each one supporting 12.5 Gbps. The format of the card is PCIe Gen3 x8 Half-length and it features 4GB of DDR4 memory. It requires its own 12VDC from the power supply of the computer.

**E. Computer (NOT INCLUDED):**

The computer should minimally has an i5 processor (or equivalent), 8GB of RAM, and a USB 3.0 port (either on the motherboard or on an add-on card). Windows 10 is recommended.

**F. DB9-BNC Harness:**

Connects to the chamber feedthrough. At the other end, one can find a barrel connector for 12VDC and 4 BNC connectors labeled Trigger In, Trigger Out 0, 1 and 2. Trigger IN accepts +3.3V TTL pulses and Trigger Out produces +3.3V TTL pulses. Length = 0.5 m

**G. 12VDC Universal Power Supply:**

This power supply generates a maximum of 60W @ 12 VDC and accepts 100-240 VAC 50-60 Hz.

**H. Water Cooler (NOT INCLUDED):**

Cooling water is required for the camera and its internal electronics. The amount of heat that needs to be removed from the airbox is about 60W. A water temperature of 15-20°C at a flow rate of 1 l/min is sufficient to cool the sensor to a temperature suitable for measurements (-20°C).

**I. 2 Stainless Steel Flexible Tubes (OPTION):** 1/4 in. OD, 24 in, Female VCR Both Ends

**J. 2 Extension Tubes: (OPTION):** 1/4 in. OD, 24 in, Male VCR, Female VCR

**K. Double-tube water feedthrough on DN40CF (2.75" OD) for cooling water (OPTION):.** Outside diameter of tubes is ¼ inch and ends are fitted with Male VCR.

**L. Beam stop parts (OPTION):**

as designed by Soleil. Smaract stages not supplied.

**M. Adaptor for 50mm Nikon objective (OPTION)**

**N. Vacuum feedthrough on DN100CF for power, optical communication and water (OPTION)**

This single feedthrough replaces B and K.



#### 4. CONDITIONS OF SALE and TERMS OF PAYMENT

All prices are in USD and exclude, duties and taxes. Terms of payment are 50% on order, 50% 30-days after delivery.

#### 5. DELIVERY AND WARRANTY

Delivery of the system is 5 months after reception of the purchase order. Terms of delivery are EXW (Varenes, Canada) (incoterms 2010).

#### 6. WARRANTY

There is a one-year warranty against faulty workmanship on the whole system.

#### 7. PRICE SCHEDULE

Item	AXIS-SXR
AXIS-SXR-60-EUV system as above with Grade 1 Sensors	174 300 USD
AXIS-SXR-60-EUV system as above with Grade 2 Sensors	140 500 USD
AXIS-SXR-60-EUV system as above with Engineering Grade Sensors	111 700 USD
<b>Options:</b>	
I: 2 Stainless Steel Flexible hoses (VCR Female-Female)	900
J: 2 Extension hoses (VCR MALE-Female)	900
K: Double-tube water feedthrough on DN40CF	850
L: Beam stop parts as designed by Soleil (Smaract stages not supplied)	2 700
M: Nikon Objective with adaptor	380
N: DN100CF for power, optical communication and water Replacing B and K	1800

This quotation is valid for 30 days.

