



Camera Technology  
Focused on Scientific Imaging  
and Challenging Inspection

## sCMOS Camera Technology



High Speed



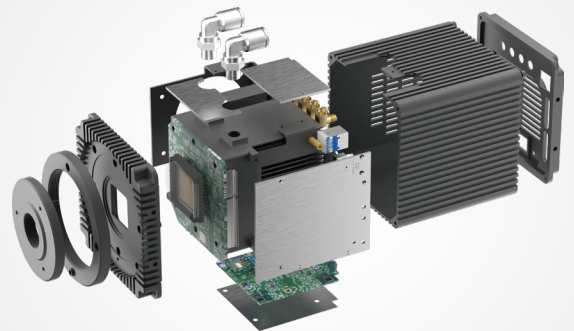
Large Format



High Sensitivity



Compact Design



OEM/ODM



# Camera Technology Focused on Scientific Imaging and Challenging Inspection

## About Us

### A Global Camera Company.

Tucsen designs and manufactures camera technology focused on scientific imaging and challenging inspection. Our job is to create reliable camera devices which allow our customers to answer challenging questions. Engineering talent and relationships with our sensor providers allow us to drive product performance and our business model allows us to also drive a price advantage. With operations in Europe, North America and Asia we help customers in numerous markets across the world helping drive answers to quality, research and medical questions.

### Designing and Manufacturing in China.

Tucsen is proud to design and manufacture in the People's Republic of China. With operations in Fuzhou, Chengdu and Changchun we can access a growing talent pool of engineers to drive a pipeline of new technology and ideas into products faster than our competitors. By utilizing our situation as a volume supplier, we can also take advantage of local supply chains to ensure we can manufacture on time and pass on our cost advantage.

### Consistently Delivering Value.

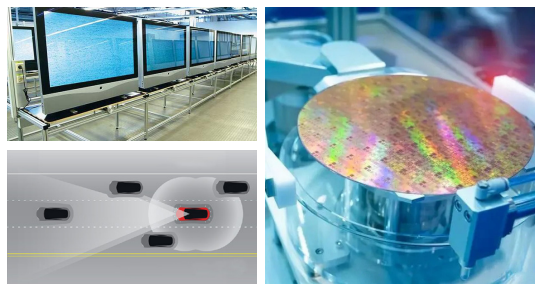
Tucsen delivers value. We deliver products that meet our specifications as noted at prices that help our customers achieve their goals. We are not cheap, we provide value, there is a large difference. We do not have to drive a corporate share price; we drive customer value. We do not add unused features to explain pricing, we drive repeatable consistency to allow our customers to hit cost targets or spend their savings on other items. We manage our business for efficiency, we control our business to deliver consistency and we drive the business to deliver constantly.

## Market



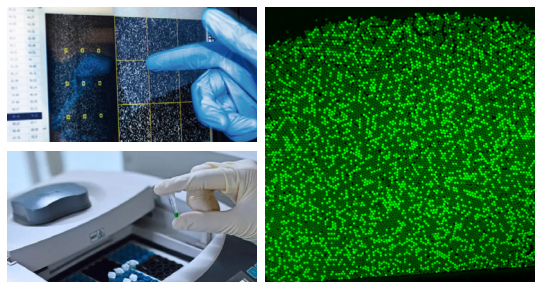
### Research

sCMOS technology delivers high QE, low noise and in formats up to 61.4mm x 61.4mm.



### Industrial Inspection

Solutions for integration of advanced imaging technologies for challenging inspections.



### Instrumentation (OEM)

High performance CMOS and sCMOS devices designed for integration and operation into small spaces.

# Catalogue

## High Speed

Dhyana 9KTDI	01
Dhyana 2100	03



## Large Format

Dhyana 6060 / 6060BSI	05
Dhyana 4040 V2 / 4040BSI	07



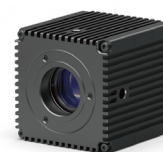
## High Sensitivity

Dhyana 400BSI V3	09
Dhyana 95V2	11
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Dhyana 400DC	14



## Compact Design

Dhyana 401A-G	15
Dhyana 401D / 201D	16



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# Dhyana 9KTDI

The Dhyana 9KTDI camera is designed for speeding up light-limited acquisition with TDI technology and BSI-CMOS to offer the first scientific grade TDI device.



## Key Features

## Benefits

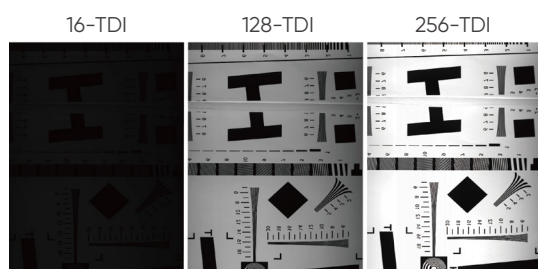
200–1100 nm	Wide spectral response across UV / Visible / NIR.
82% Peak QE	High photon collection efficiency for lower illumination intensity.
256 stages TDI	More TDI stages deliver higher SNR. <sup>[1]</sup>
510 kHz @ 9K	> 50X faster than the back-illuminated TDI-CCD cameras. <sup>[2]</sup>
Air & Liquid Cooling	Maintains low dark noise, minimizes vibration, and aids thermal stability.

## Typical Applications

- Wafer Inspection
- FPD Inspection
- Fluorescence Detection

## Noted Examples

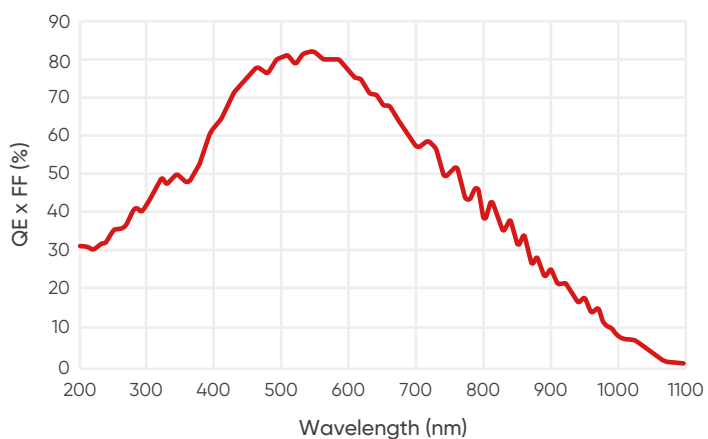
[1] More TDI stages deliver higher SNR.



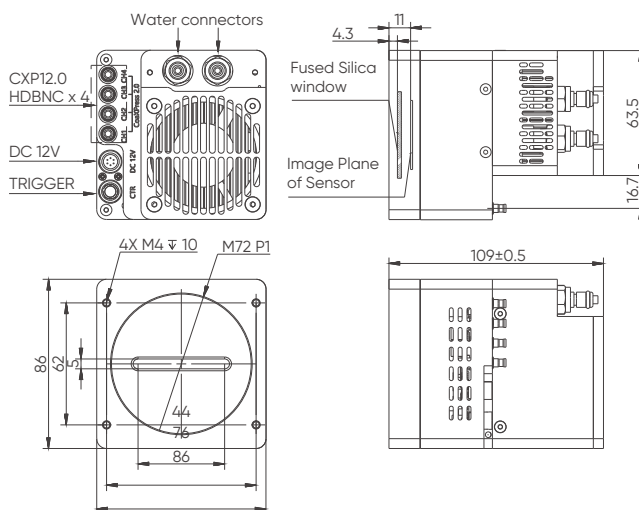
[2] > 50X faster than CCD technology.

	Mpixel / s
Dhyana 9KTDI 9K @ 510 kHz	<b>4590</b>
BSI TDI-CCD 2K @ 50 kHz	<b>100</b>

## Quantum Efficiency



## Dimensions (Unit: mm)





Model	Dhyana 9KTDI
Sensor Type	BSI sCMOS TDI
Sensor Model	Gpixel GLT5009BSI
QE	82% @ 550 nm, 50% @ 350 nm, 38% @ 800 nm
Color/Mono	Mono
Array Diagonal	45.4 mm
Effective Area	45.36 mm x 1.28 mm
Resolution	9072
Pixel Size	5 $\mu\text{m}$ x 5 $\mu\text{m}$
Operation Mode	TDI, Area
TDI Stage	4, 8, 16, 32, 64, 96, 128, 160, 192, 224, 240, 248, 252, 256
Scan Direction	Forward, Reverse, trigger control
CTE	$\geq 0.99993$
Data Bit Depth	12 bit, 10 bit, 8 bit
Full-Well Capacity	Typical: 15.8 ke- @ 12 bit, 19.2 ke- @ 10 bit
Dynamic Range	Typical: 69 dB @ 12 bit, 64 dB @ 10 bit
Max. Line Rate	300 kHz @ 12 bit, 350 kHz @ 10 bit, 510 kHz @ 8 bit
Readout Noise	7.2 e- @ 12 bit, 11.4 e- @ 10 bit
DSNU	1 e-
PRNU	0.3%
Cooling Method	Air, Liquid
Max. Cooling	40 °C below ambient
Binning	2 x 1, 4 x 1, 8 x 1
ROI	Support
Trigger Mode	Trigger Input, Scan Direction Input
Output Trigger Signals	Strobe out
Trigger Interface	Hirose
Timestamp Accuracy	8 ns
Gain	Analog Gain: x2 ~ x8, Digital Gain: x0.5 ~ x10
Data Interface	CoaxPress 2.0
Optical Interface	M72 / Customization
Power Supply	12 V / 8 A
Power Consumption	< 60 W
Dimensions	86 mm x 86 mm x 109 mm
Weight	1100 g
Software	Samplepro, Matlab
SDK	C, C++, C#
Operating System	Windows, Linux
Operating Environment	Working: Temperature 0~40 °C , Humidity 0~85% Storage: Temperature 0~60 °C , Humidity 0~90%

# Dhyana 2100

The Dhyana 2100 is designed to deliver the maximum speed and maximum resolution combination seen yet with a sCMOS sensor.



## Key Features

## Benefits

450 fps @ 21 MP	To allow the observation of fine details at high speed. <sup>[1]</sup>
Fast Binning Mode	Up to 1725 fps @ 5 MP with high sensitivity and high dynamic range. <sup>[2]</sup>
Global Shutter	High image quality standard with no artifacts and no distortion.
Air & Liquid Cooling	Maintains low dark noise, minimizes vibration, and aids thermal stability.

## Typical Applications

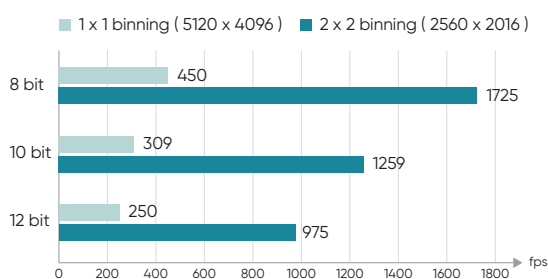
- Wafer Inspection
- FPD Inspection
- Aerial Photography
- Voltage Sensitive Imaging
- Cardiac Imaging

## Noted Examples

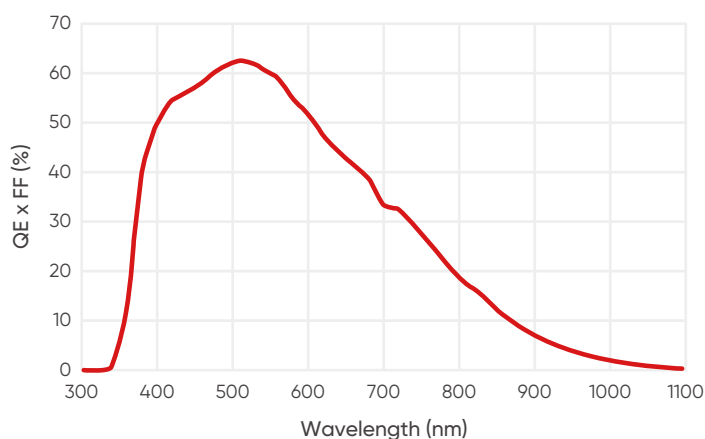
[1] High-Speed using global shutter provides clear images from objects moving at speed.



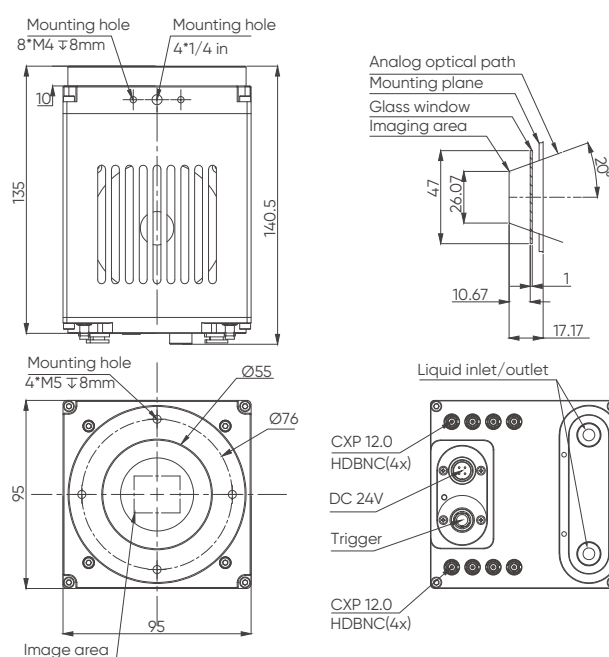
[2] Speed Comparison in Fast Binning Mode.



## Quantum Efficiency



## Dimensions (Unit: mm)



Model	Dhyana 2100
Sensor Type	FSI CMOS
Sensor Model	Gpixel GSPRINT4521
Peak QE	63% @ 520 nm
Color/Mono	Mono
Array Diagonal	29.5 mm
Effective Area	23.04 mm (H) x 18.43 mm (V)
Resolution	5120 (H) x 4096 (V)
Pixel Size	4.5 $\mu\text{m}$ x 4.5 $\mu\text{m}$
Full-Well Capacity	28 ke <sup>-</sup> @ 12 bit gain 0, 16.5 ke <sup>-</sup> @ 12 bit gain 2, 120 ke <sup>-</sup> @ binned
Dynamic Range	68.8 dB @ 12 bit gain 2
Frame Rate	Full mode: 450 fps @ 8 bit, 300 fps @ 10 bit, 250 fps @ 12 bit Base mode: 225 fps @ 8 bit, 150 fps @ 10 bit, 150 fps @ 12 bit
Readout Noise	3.5 e <sup>-</sup> @ 12 bit (Median)
Shutter Type	Global
Exposure Time	4 $\mu\text{s}$ ~ 10 s
DSNU	1.1 e <sup>-</sup>
PRNU	0.3%
Cooling Method	Air, Liquid
Max. Cooling	30 °C below ambient
Binning	2 x 2, 4 x 4, 8 x 8
ROI	Support
Trigger Mode	Hardware, Software
Output Trigger Signals	Exposure start, Readout end
Trigger Interface	Hirose
Data Interface	Full mode: CXP12 x8, Base mode: CXP12 x4
Data Bit Depth	8 bit, 10 bit, 12 bit
Optical Interface	M58 / F-Mount / user Customization
Power Supply	DC 24 V / 6 A
Power Consumption	≤ 120 W
Dimensions	95 mm x 95 mm x 140.5 mm
Weight	1816 g
Software	SamplePro, LabView, Matlab, Micromanager
SDK	C, C++, C#
Operating System	Windows, Linux
Operating Environment	Working: Temperature 0~40 °C , Humidity 0~85% Storage: Temperature 0~60 °C , Humidity 0~90%

# Dhyana 6060 / 6060BSI

The Dhyana 6060 / 6060BSI brings the speed and dynamic range to large format imaging missing from previous CCD technology.<sup>[1]</sup> With a massive 86 mm diameter, high quantum efficiency and 10-micron pixels size, it is well suited to scientific applications in areas such as Astronomy and Physics.



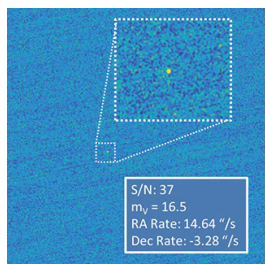
Key Features	6060	6060BSI	Benefits
Field of View	61.4 mm x 61.4 mm		Very large field of view from 36 MP, 10 $\mu$ m pixel size sensor.
Quantum Efficiency	72% QE	95% QE	High photon collection efficiency for lower illumination intensity.
Frame Rate	44 fps	26.4 fps	Faster data rates than the previous CCD technology.
Full-well Capacity	123 ke-	100 ke-	High dynamic range for measurement of bright and dim signals at the same time.
Cooling Method	Air & Liquid		Maintains low dark noise, minimizes vibration, and aids thermal stability.

## Typical Applications

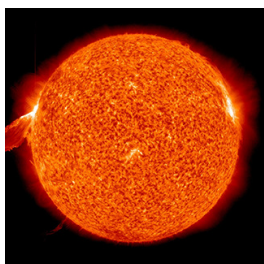
- Space Debris Detection
- Solar Astronomy
- X-ray Detection
- Quantum Optics

## Noted Examples

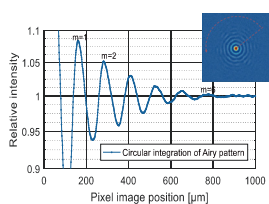
[1] Large sCMOS technology can be used in a wide range of applications previously limited by CCD technology.



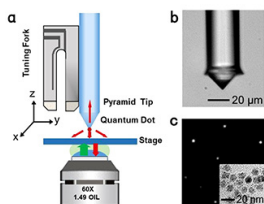
Space Debris



Solar

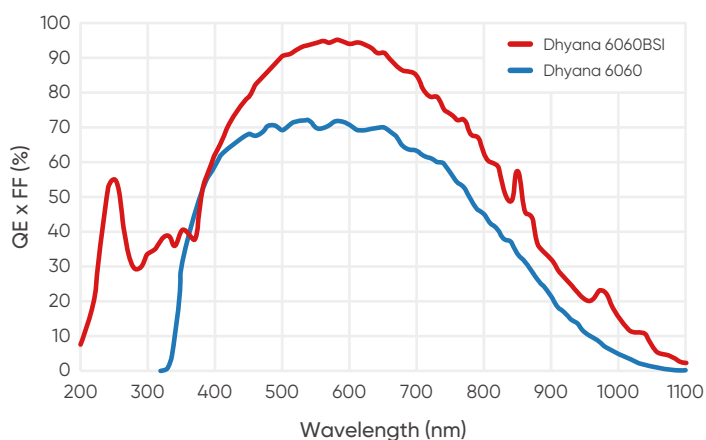


X-ray

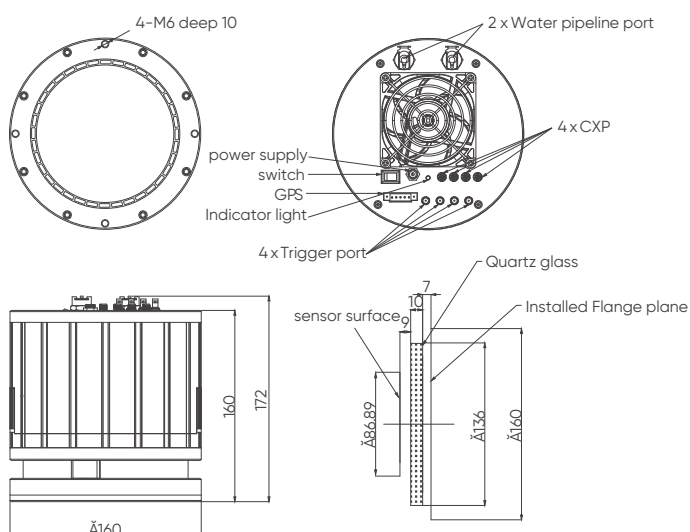


Quantum

## Quantum Efficiency



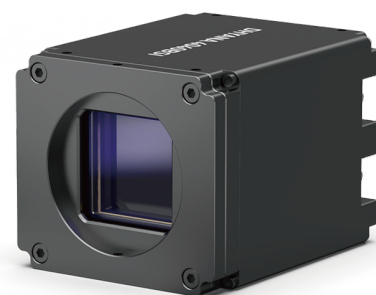
## Dimensions (Unit: mm)



Model	Dhyana 6060	Dhyana 6060BSI
Sensor Type	FSI sCMOS	BSI sCMOS
Sensor Model	Gpixel GSENSE6060	Gpixel GSENSE6060BSI
Peak QE	72% @ 550 nm	95% @ 580 nm
Color/Mono	Mono	
Array Diagonal	86.8 mm	
Effective Area	61.4 mm x 61.4 mm	
Resolution	6144 (H) x 6144 (V)	
Pixel Size	10 $\mu\text{m}$ x 10 $\mu\text{m}$	
Full-Well Capacity	Typical: 123 ke-	Typical: 102 ke-
Dynamic Range	91 dB	90 dB
Frame Rate	44 fps @ 12 bit STD, 19 fps @ 16 bit HDR, 14 fps @ 14 bit STD	26.4 fps @ 12 bit STD, 11.3 fps @ 12 bit HDR, 8.6 fps @ 14 bit STD
Readout Noise	3 e- (Median)	
Shutter Type	Rolling	
Exposure Time	7 $\mu\text{s}$ ~ 300 s	12 $\mu\text{s}$ ~ 300 s
DSNU	1.5 e-	
PRNU	0.2%	
Cooling Method	Air, Liquid	
Max. Cooling	45 °C below ambient	
Dark Current	Air: 0.25 e-/pixel/s, Liquid: 0.15 e-/pixel/s	
Binning	2 x 2, 4 x 4	
ROI	Support	
Timestamp Accuracy	1 $\mu\text{s}$	
GPS	Support	
Trigger Mode	Hardware, Software	
Output Trigger Signals	Exposure start, Global, Readout end, High level, Low level	
Trigger Interface	SMA	
Data Interface	CoaxPress 2.0	
Data Bit Depth	12 bit, 14 bit, 16 bit	
Optical Interface	Customization	
Power Supply	12 V / 10 A	
Power Consumption	< 100 W	
Dimensions	$\phi$ 160 mm x 164 mm	
Weight	4 kg	
Software	Samplepro, MAXIMDL, Labview, Matlab, EPICS	
SDK	C, C++, C#	
Operating System	Windows, Linux	
Operating Environment	Working: Temperature 0~40 °C , Humidity 0~85% Storage: Temperature 0~60 °C , Humidity 0~90%	

# Dhyana 4040 V2 / 4040BSI

The Dhyana 4040 V2 / 4040BSI brings the speed and dynamic range to large format imaging missing from previous CCD technology.<sup>[1]</sup> With a 52 mm diameter, high quantum efficiency and 9-micron pixels size, it is well suited to scientific applications in areas such as Astronomy and Physics.



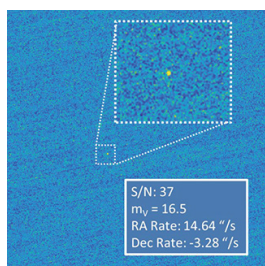
Key Features	4040 V2	4040BSI	Benefits
Field of View	36.9 mm x 36.9 mm		Large field of view from 16 MP, 9 $\mu$ m pixel size sensor.
Quantum Efficiency	74% QE   90% QE		High photon collection efficiency for lower illumination intensity.
Frame Rate	16.5 fps		Faster data rates than the previous CCD technology.
Full-well Capacity	70 ke-   39 ke-		High dynamic range for the measurement of bright and dim signals at the same time.
Cooling Method	Air & Liquid		Maintains low dark noise, minimizes vibration, and aids thermal stability.

## Typical Applications

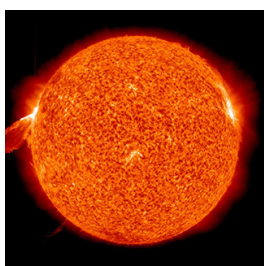
- Space Debris Detection
- Solar Astronomy
- X-ray Detection
- Quantum Optics

## Noted Examples

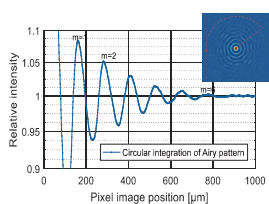
[1] Large sCMOS technology can be used in a wide range of applications previously limited by CCD technology.



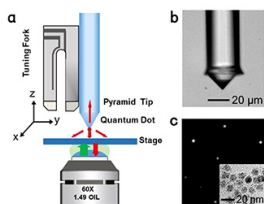
Space Debris



Solar

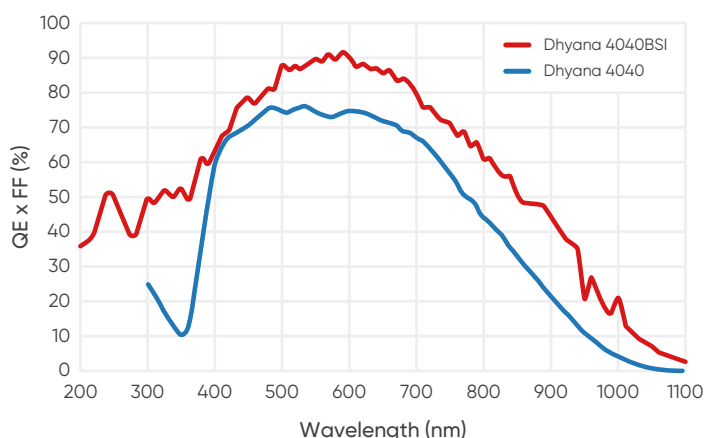


X-ray

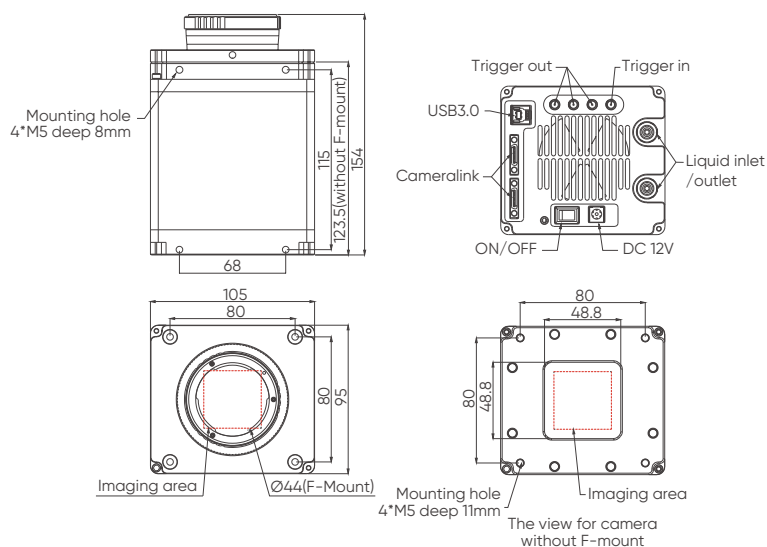


Quantum

## Quantum Efficiency



## Dimensions (Unit: mm)





Model	Dhyana 4040 V2	Dhyana 4040BSI
Sensor Type	FSI sCMOS	BSI sCMOS
Sensor Model	Gpixel GSENSE4040	Gpixel GSENSE4040BSI
Peak QE	74% @ 600 nm	90% @ 550 nm
Color/Mono	Mono	
Array Diagonal	52.1 mm	
Effective Area	36.9 mm x 36.9 mm	
Resolution	4096 (H) x 4096 (V)	
Pixel Size	9 $\mu\text{m}$ x 9 $\mu\text{m}$	
Full-Well Capacity	Typical: 70 ke-	Typical: 39 ke-
Dynamic Range	86 dB	85 dB
Frame Rate	16.5 fps @ CameraLink, 9.7 fps @ USB 3.0	
Readout Noise	3.6 e-	2.3 e-
Shutter Type	Rolling	
Exposure Time	10 $\mu\text{s}$ ~ 3600 s	
DSNU	0.5 e-	
PRNU	0.2%	
Cooling Method	Air, Liquid	
Max. Cooling	45 °C below ambient	
Dark Current	Air: 0.15 e-/pixel/s, Liquid: 0.1 e-/pixel/s	
Binning	2 x 2, 4 x 4	
ROI	Support	
Timestamp Accuracy	1 $\mu\text{s}$	
GPS Timestamp	8 ns	
Trigger Mode	Hardware, Software	
Output Trigger Signals	Exposure start, Global, Readout end, High level, Low level	
Trigger Interface	SMA, CC1	
Data Interface	USB 3.0, CameraLink	
Data Bit Depth	12 bit, 16 bit	
Optical Interface	F-Mount / Customization	
Power Supply	12 V / 8 A	
Power Consumption	< 45 W	
Dimensions	105 mm x 95 mm x 123.5 mm	
Weight	2 kg	
Software	Mosaic1.6, Samplepro, MaximDL, Labview, Matlab	
SDK	C, C++, C#	
Operating System	Windows, Linux	
Operating Environment	Working: Temperature 0~40 °C , Humidity 0~85% Storage: Temperature 0~60 °C , Humidity 0~90%	

# Dhyana 400BSI V3

The Dhyana 400BSI V3 delivers perfect sensitivity and resolution for high NA microscope objectives, being designed lighter, and needing less power, making it ideal for integrating and fitting into small spaces.<sup>[1]</sup>



## Key Features

95% QE & Lowest Noise

6.5  $\mu\text{m}$  x 6.5  $\mu\text{m}$  Pixel Size

18 mm Array Diagonal

Rolling Shutter Control Mode

Camera Link & USB 3.0

Air & Liquid Cooling

## Benefits

High signal-to-noise ratio across UV / Visible / NIR.

Optimal spatial sampling and sensitivity for 100x, 60x and 40x microscope.

Ideal for the microscopes that have C-mount ports.

Allowed to define line time delays or slit heights for scanning systems such as Light-sheet Microscopy.<sup>[2]</sup>

While the USB3.0 is quite flexible and easy to use, the Camera Link is a faster and stable option up to 100 fps @ 4.2 MP.

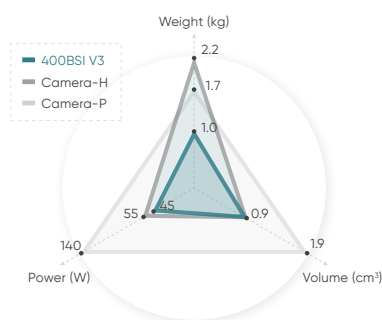
Maintains low dark noise, minimizes vibration, and aids thermal stability.

## Typical Applications

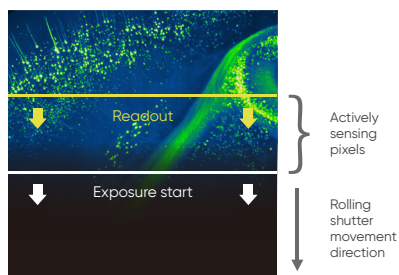
- Advanced Microscopy
- Spectral Imaging
- Astrophysical

## Noted Examples

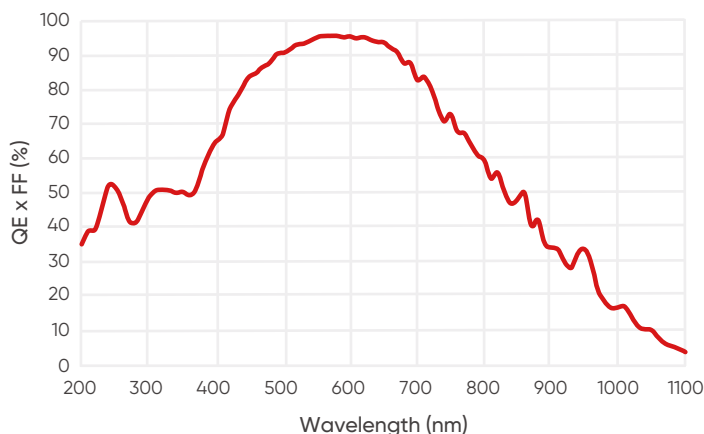
[1] Compact, lighter design requiring less power.



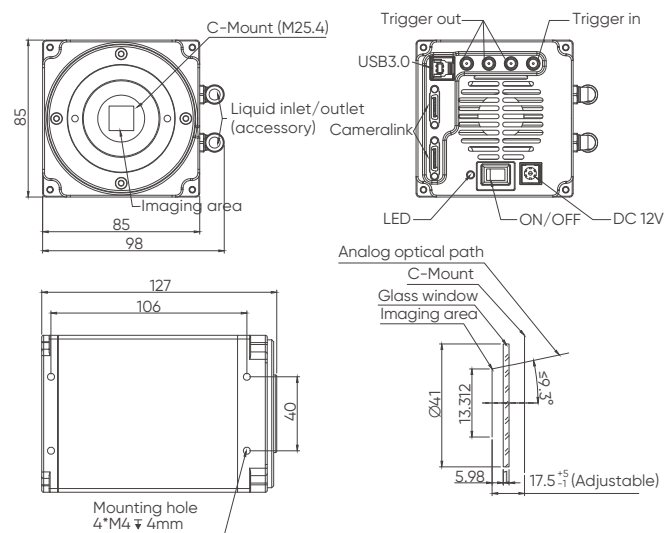
[2] The Rolling Shutter Control Mode applied in Light-sheet Microscopy.



## Quantum Efficiency



## Dimensions (Unit: mm)



Model	Dhyana 400BSI V3
Sensor Type	BSI sCMOS
Sensor Model	Gpixel GSENSE2020BSI
Peak QE	95% @ 600 nm
Color/Mono	Mono
Array Diagonal	18.8 mm
Effective Area	13.3 mm x 13.3 mm
Resolution	2048 (H) x 2048 (V)
Pixel Size	6.5 $\mu\text{m}$ x 6.5 $\mu\text{m}$
Full-Well Capacity	Typical: 45 ke-
Dynamic Range	90 dB
Frame Rate	HDR mode: 74 fps @ CameraLink, 40 fps @ USB 3.0 High-speed mode: 100 fps @ CameraLink
Readout Noise	CMS: 1.1 e- (Median), 1.2 e- (RMS)
Shutter Type	Rolling, Global reset
Exposure Time	6.6 $\mu\text{s}$ ~ 10 s
DSNU	0.2 e-
PRNU	0.3%
Cooling Method	Air, Liquid
Max. Cooling	45 °C below ambient
Dark Current	Air: 0.15 e-/pixel/s @ -15 °C, Liquid: 0.10 e-/pixel/s @ -25 °C
Binning	2 x 2, 4 x 4
ROI	Support
Timestamp Accuracy	1 $\mu\text{s}$
Trigger Mode	Hardware, Software
Output Trigger Signals	Exposure start, Global, Readout end, High level, Low level
Trigger Interface	SMA
Data Interface	USB 3.0, CameraLink
Data Bit Depth	11 bit, 12 bit, 16 bit
Optical Interface	C-mount
Power Supply	12 V / 8 A
Power Consumption	45 W
Dimensions	85 mm x 85 mm x 127 mm
Weight	995 g
Software	Mosaic, Samplepro, LabView, Matlab, Micromanager, MetaMorph
SDK	C, C++, C#
Operating System	Windows, Linux
Operating Environment	Working: Temperature 0~40 °C , Humidity 0~85% Storage: Temperature 0~60 °C , Humidity 0~90%

# Dhyana 95V2

The Dhyana 95V2 delivers ultimate sensitivity achieving similar results to EMCCD camera technology without the concerns of signal drift, gain aging, multiplication gain noise (1.4x) and headaches of export control restrictions.<sup>[1]</sup>



## Key Features

95% QE & Lowest Noise

11  $\mu\text{m}$  x 11  $\mu\text{m}$  Pixel Size

32 mm Array Diagonal

100 ke- Full-well Capacity

CameraLink & USB 3.0

Air & Liquid Cooling

## Benefits

Higher SNR than EMCCD when the signal (photon)  $> 3 e^-$ .<sup>[2]</sup>

Large pixels capture 3x the light of standard 6.5  $\mu\text{m}$  pixels to maximize photon detection.

Capture maximum field of views of the large samples.

High dynamic range for the measurement of bright and dim signals at the same time.

Use the flexibility of USB or if additional speed is required move to Camera Link.

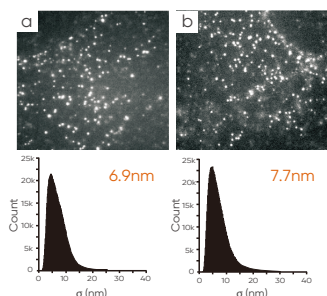
Maintains low dark noise, minimizes vibration, and aids thermal stability.

## Typical Applications

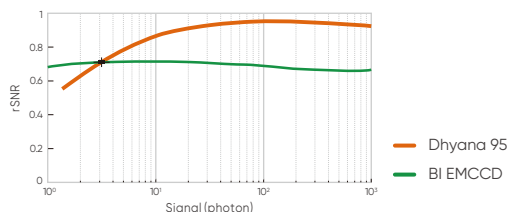
- Advanced Microscopy
- Spectral Imaging
- X-ray Imaging
- Astrophysical

## Noted Examples

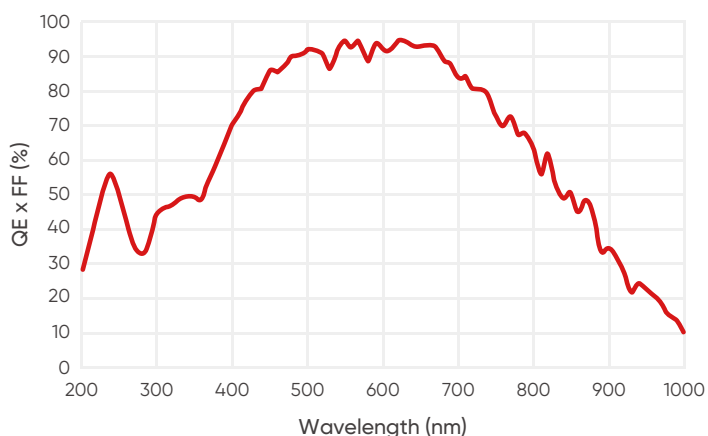
[1] Dhyana 95 demonstrating higher localization accuracy than EMCCD in single-molecule localization experiments.



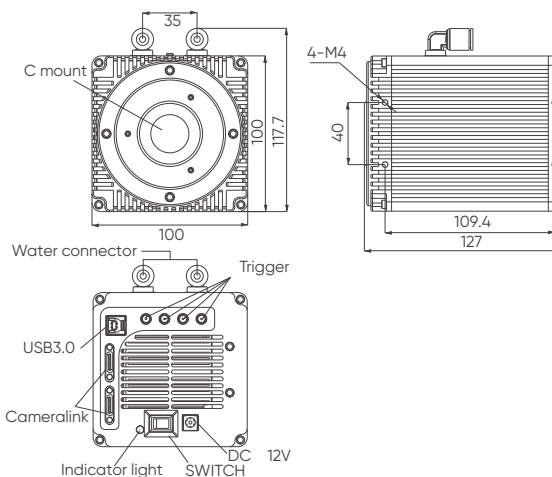
[2] The Higher SNR than EMCCD when the signal (photon)  $> 3 e^-$ .



## Quantum Efficiency



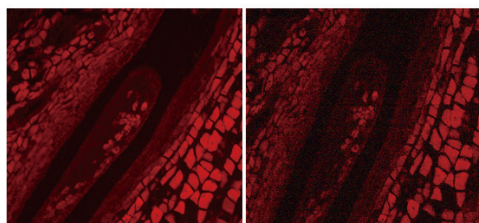
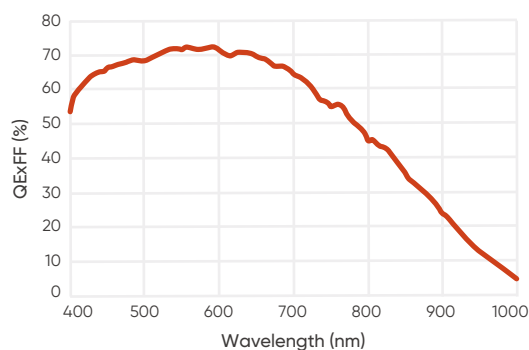
## Dimensions (Unit: mm)



Model	Dhyana 95V2
Sensor Type	BSI sCMOS
Sensor Model	Gpixel GSENSE400BSI
Peak QE	95% @ 560 nm
Color/Mono	Mono
Array Diagonal	31.9 mm
Effective Area	22.5 mm x 22.5 mm
Resolution	2048 (H) x 2048 (V)
Pixel Size	11 $\mu\text{m}$ x 11 $\mu\text{m}$
Full-Well Capacity	Typical: 80 ke <sup>-</sup> @ HDR, 100 ke <sup>-</sup> @ STD
Dynamic Range	90 dB
Frame Rate	24 fps @ 16 bit HDR, 48 fps @ 12 bit STD
Readout Noise	1.6 e <sup>-</sup> (Median), 1.7 e <sup>-</sup> (RMS)
Shutter Type	Rolling
Exposure Time	21 $\mu\text{s}$ ~ 10 s
DSNU	0.2 e <sup>-</sup>
PRNU	0.3%
Cooling Method	Air, Liquid
Max. Cooling	45 °C below ambient
Dark Current	Air: 0.5 e <sup>-</sup> /pixel/s, Liquid: 0.25 e <sup>-</sup> /pixel/s
Binning	2 x 2, 4 x 4
ROI	Support
Timestamp Accuracy	1 $\mu\text{s}$
Trigger Mode	Hardware, Software
Output Trigger Signals	Exposure start, Global, Readout end, High level, Low level
Trigger Interface	SMA
Data Interface	USB 3.0, CameraLink
Data Bit Depth	12 bit, 16 bit
Optical Interface	C-mount / F-mount
Power Supply	12 V / 8 A
Power Consumption	60 W
Dimensions	C-mount: 100 mm x 118 mm x 127 mm; F-mount: 100 mm x 118 mm x 157 mm
Weight	1613 g
Software	Mosaic, Samplepro, LabView, Matlab, Micromanager, MetaMorph
SDK	C, C++, C#
Operating System	Windows, Linux
Operating Environment	Working: Temperature 0~40 °C , Humidity 0~85% Storage: Temperature 0~60 °C , Humidity 0~90%

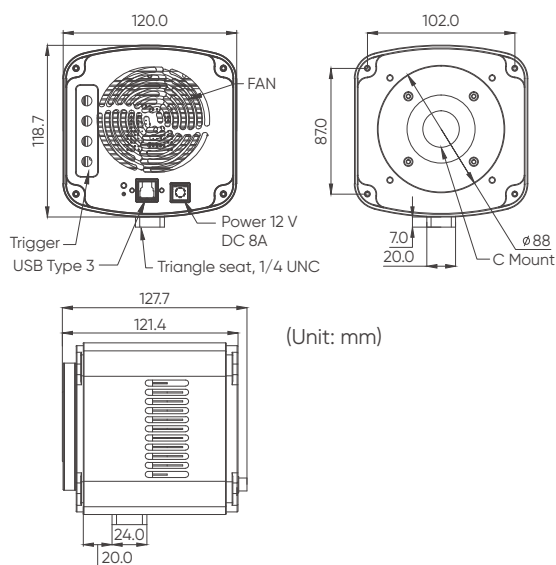
# Dhyana 400D

The Dhyana 400D drives maximum performance from a front-illuminated sCMOS sensor. It achieves nearly 72% QE with only 2.5 e<sup>-</sup> of read noise along excellent dark current performance reduced by cooling. It is the perfect choice for low signal applications pushing exposures into seconds and even minutes.



Dhyana 400D, 40 ms

CCD Camera, 40 ms



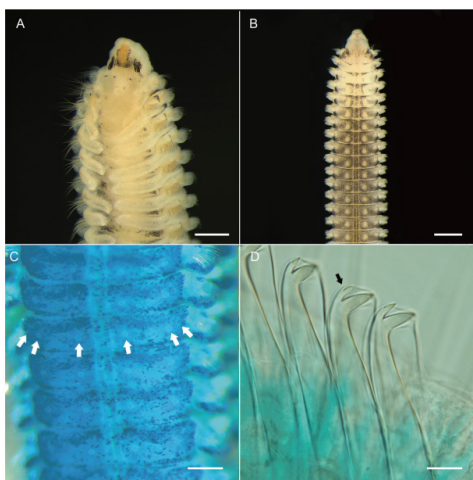
(Unit: mm)

Model	Dhyana 400D
Sensor Type	FSI sCMOS
Sensor Model	Gpixel GSENSE2020
Peak QE	72% @ 595 nm
Color/Mono	Mono
Array Diagonal	18.8 mm
Effective Area	13.3 mm x 13.3 mm
Resolution	2048 (H) x 2040 (V)
Pixel Size	6.5 $\mu\text{m}$ x 6.5 $\mu\text{m}$
Full-Well Capacity	Typical: 45 ke <sup>-</sup>
Dynamic Range	86.6 dB
Frame Rate	35 fps @ 16 bit
Readout Noise	High Gain: 2 e <sup>-</sup>
Shutter Type	Rolling
Exposure Time	13 $\mu\text{s}$ ~ 10 s
Cooling Method	Air
Max. Cooling	35 °C below ambient
Dark Current	0.12 e <sup>-</sup> /pixel/s @ -10 °C
Binning	2 x 2
ROI	Support
Trigger Mode	Hardware, Software
Output Trigger Signals	Exposure start, Global, Readout end
Trigger Interface	SMA
Data Interface	USB 3.0
Data Bit Depth	12bit, 16 bit
Optical Interface	C-mount
Power Supply	12V / 8A
Power Consumption	60 W
Dimensions	120 mm x 119 mm x 121 mm
Weight	1853 g
Software	Mosaic, LabView, Matlab, Micromanager
SDK	C, C++, C#
Operating System	Windows, Linux
Operating Environment	Temperature 0~40 °C , Humidity 0~85%
Storage Environment	Temperature 0~60 °C , Humidity 0~90%



# Dhyana 400DC

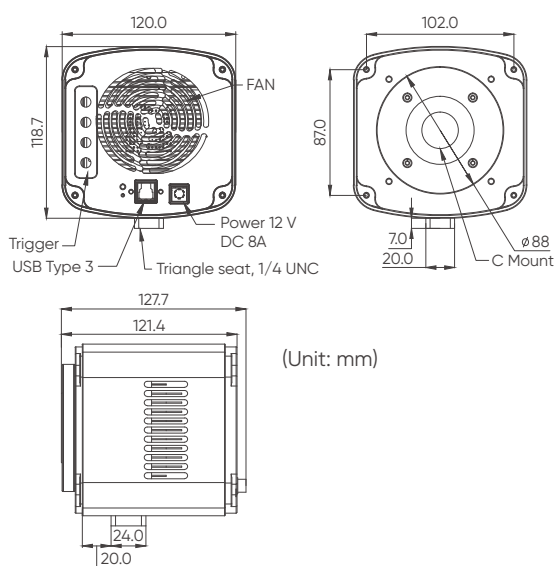
The Dhyana 400DC offers sCMOS capabilities to those who need color imaging for general documentation or those looking to image multichannel fluorescence without the need for automating their illumination paths.



Camera: Dhyana 400DC

Sample: New species of the genus Spio

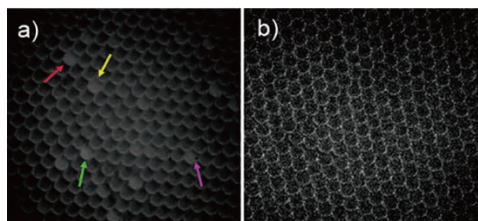
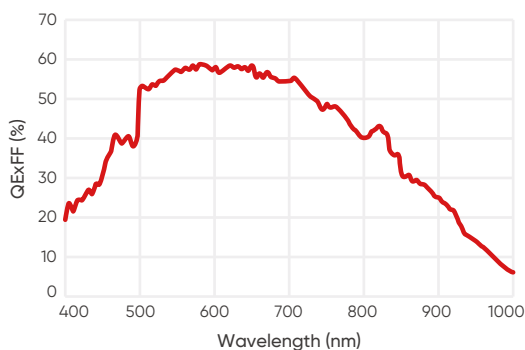
Author: Lee GH, Meißner K, Yoon SM, Min GS.



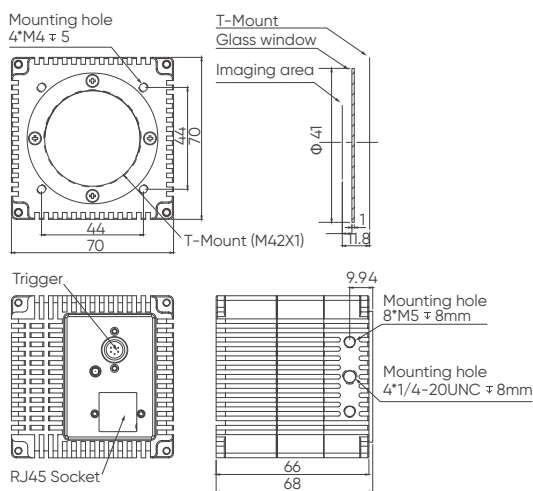
Model	Dhyana 400DC
Sensor Type	FSI sCMOS
Sensor Model	Gpixel GSENSE2020s
Color/Mono	Color
Array Diagonal	18.8 mm
Effective Area	13.3 mm x 13.3 mm
Resolution	2048 (H) x 2040 (V)
Pixel Size	6.5 $\mu\text{m}$ x 6.5 $\mu\text{m}$
Full-Well Capacity	Typical: 45 ke-
Dynamic Range	86.6 dB
Frame Rate	22 fps @ 8 bit, 16 fps @ 16 bit
Readout Noise	High Gain: 1.7 e-
Shutter Type	Rolling
Exposure Time	21 $\mu\text{s}$ ~ 10 s
Cooling Method	Air
Max. Cooling	35 °C below ambient
Dark Current	0.12 e-/pixel/s @ -10 °C
Binning	2 x 2
ROI	Support
Trigger Mode	Hardware, Software
Output Trigger Signals	Exposure start, Global, Readout end
Trigger Interface	SMA
Data Interface	USB 3.0
Data Bit Depth	16 bit
Optical Interface	C-mount
Power Supply	12 V / 8 A
Power Consumption	50 W
Dimensions	120 mm x 119 mm x 121 mm
Weight	1853 g
Software	Mosaic, LabView, Matlab, Micromanager
SDK	C, C++, C#
Operating System	Windows, Linux
Operating Environment	Temperature 0~40 °C , Humidity 0~85%
Storage Environment	Temperature 0~60 °C , Humidity 0~90%

# Dhyana 401A-G

The Dhyana 401A-G is the sCMOS answer for system integrators who seek sCMOS performance but want to preserve their instrument COGS/cost. Built in a small package using a front illuminated 11  $\mu\text{m}$  pixel sensor, the camera delivers what most systems need. It also remains the most cost-effective choice when compared to its contemporaries.



401A (11  $\mu\text{m}$  pixel size), CCD (5  $\mu\text{m}$  pixel size)

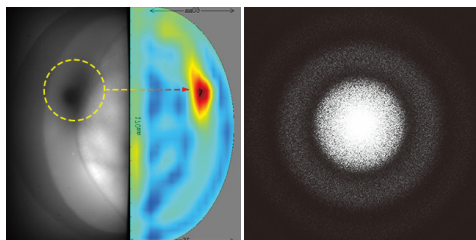
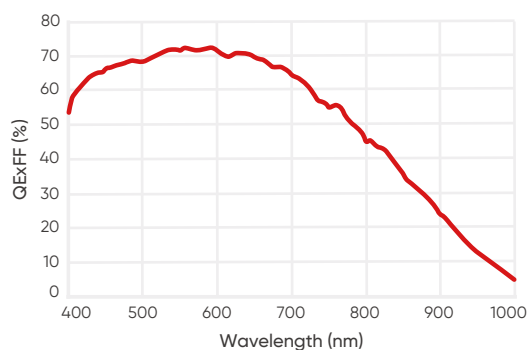


(Unit: mm)

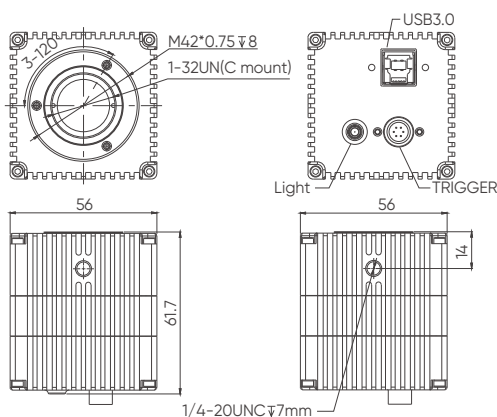
Model	Dhyana 401A-G
Sensor Type	FSI sCMOS
Sensor Model	Gpixel GSENSE400
Peak QE	58% @ 600 nm
Color/Mono	Mono
Array Diagonal	32 mm
Effective Area	22.5 mm x 22.5 mm
Resolution	2048 (H) x 2048 (V)
Pixel Size	11 $\mu\text{m}$ x 11 $\mu\text{m}$
Full-Well Capacity	Typical: 91 ke-
Dynamic Range	95 dB
Frame Rate	20 fps
Readout Noise	Typical: 1.5 e- (Median)
Shutter Type	Rolling
Exposure Time	21 $\mu\text{s}$ ~ 1 s
Binning	2 x 2
ROI	Support
Trigger Mode	Hardware, Software
Output Trigger Signals	Exposure start, Readout end
Trigger Interface	Hirose
Data Interface	GigE
Data Bit Depth	12 bit, 16 bit
Optical Interface	M42
Power Supply	12 V / 2 A
Power Consumption	6 W
Dimensions	70 mm x 70 mm x 68 mm
Weight	540 g
Software	Samplepro
SDK	C, C++, C#
Operating System	Windows, Linux
Operating Environment	Temperature 0~40 $^{\circ}\text{C}$ , Humidity 0~85%
Storage Environment	Temperature 0~60 $^{\circ}\text{C}$ , Humidity 0~90%

# Dhyana 401D / 201D

The Dhyana 401D / 201D is the sCMOS answer for system integrators who seek sCMOS performance but want to preserve their instrument COGS / cost. Built in a small package using a front illuminated 6.5µm pixel sensor, the camera delivers what most systems need cost-effective of other contemporaries.



Tumor-DOT Detection

Blood-Diffractive  
Phase Imaging

(Unit: mm)

Model	Dhyana 401D	Dhyana 201D
Sensor Type	FSI sCMOS	
Sensor Model	Gpixel GSENSE2020	Gpixel GSENSE2011
Peak QE	72% @ 595nm	
Color/Mono	Mono	
Array Diagonal	18.8 mm	15.3 mm
Effective Area	13.3 mm x 13.3 mm	13.3 mm x 7.5 mm
Resolution	2048 (H) x 2048 (V)	2048 (H) x 1152 (V)
Pixel Size	6.5 µm x 6.5 µm	
Full-Well Capacity	Typical: 45 ke-	
Frame Rate	40 fps @ 16 bit, 45 fps @ 8 bit	70 fps @ 16 bit, 80 fps @ 8 bit
Readout Noise	2.1 e- (Median)	
Shutter Type	Rolling	
Exposure Time	10 µs ~ 10 s	
Binning	2 x 2, 4 x 4	
ROI	Support	
Trigger Mode	Hardware, Software	
Output Trigger Signals	Exposure start, Readout end	
Trigger Interface	Hirose	
Data Interface	USB 3.0	
Data Bit Depth	8 bit, 12bit, 16 bit	
Optical Interface	C-mount	
Power Supply	USB 3.0	
Power Consumption	< 4 W	
Dimensions	56 mm x 56 mm x 61.7 mm	
Weight	305 g	
Software	Mosaic, LabView, Matlab, Micromanager, Samplepro	
SDK	C, C++, C#	
Operating System	Windows, Linux	
Operating Environment	Temperature 0~40 °C , Humidity 0~85%	
Storage Environment	Temperature 0~60 °C , Humidity 0~90%	

## Mosaic 1.6 Tucsens Camera Control Software

### 1) Camera Parameter Control

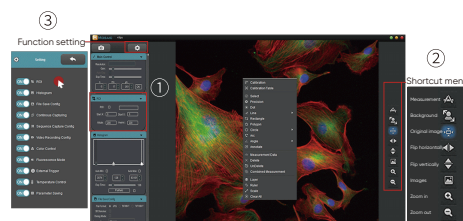
Precision control, process and analysis on imaging parameters.

### 2) Process & Measure

Fast processing and measurement on images.

### 3) Customization

Create custom layouts and workflows



## SDK for Developers

Tucsens SDK kit is powerful and easy to develop in multiple systems.

- 1) SDK dynamic library files, development instruction and MFC/C# sample source code.
- 2) Windows, Mac and Linux support using the same interface to develop
- 3) GeniCam support using standard protocol and general port and function calling
- 4) C/C++/C#/Python support
- 5) Multi-camera support, integration and development
- 6) Rapid support of newly released product features



## Third-party Software

Tucsens supports a wide variety of third party software packages allowing us to support a wide number of markets and applications.

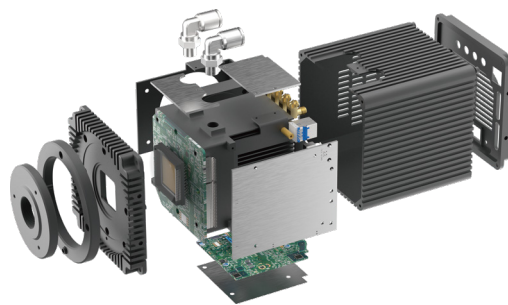
- 1) Scientific software: Micromanager/MetaXpress/Matlab/Labview/Metamorph
- 2) Astrophysical software: MaximDL/Epics
- 3) Medical health protocol: Directshow/Twain
- 4) Machine vision software: Halcon

## One Driver for All Cameras

Applicable to all Tucsens sCMOS cameras, ensuring easy installation and easy operation.

## OEM /ODM Provider

Tucsen Photonics is an OEM/ODM provider. Thousands of units each year leave our factory to be used in various markets across the world helping drive answers to quality, research, and medical questions. Whether your target is new-product development, upgrading an existing product or simply a cost-cutting exercise on an existing product line, we can help.



## Benefits of Working With Us

### 1) Take First Mover Advantage

We introduce industry leading technologies every year, such as sCMOS, BSI TDI, large formats, soft X-ray variations. By rapidly incorporating the latest technology we help our partners expand their product capabilities helping them take first mover advantage in their own markets.

### 3) Save Switching Time and Costs

We can provide rapid customization using a series of core technical platforms developed over the past 10 years of OEM project experience. We understand your space limitations, software needs, as well as technical and quality requirements.

### 2) Maintain Quality Consistency

We manage our business efficiently to ensure we constantly deliver consistency. Our advanced manufacturing facilities and China supply chains which means you're worry-free even in a tight supply and demand situation.

### 4) Efficient Support

We offer a global support network ensuring you can get information on your own time zone. These teams work quickly and efficiently with our factory teams to ensure we get you the answers to questions you have relating to product functionality or delivery/shipments status.

## Customer Cases



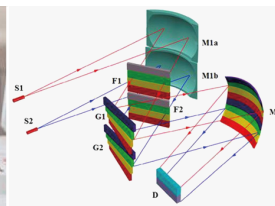
Life Science



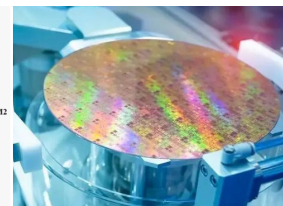
Material Research



Chemiluminescence



Spectral Analysis



Microchip Inspection

## Tucsen Photonics Co.,Ltd.



Camera Technology  
Focused on Scientific Imaging  
and Challenging Inspection



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