

COSMOS-3k LARGE AREA CMOS CAMERA

KEY FEATURES

- Large 3k x 3k pixel sensor
- > 90% QE
- 10 μm pixel size
- < 1 e^- read noise
- 70 fps at full resolution
- Sensor temperature < -25°C
- Dark current < 0.05 $\text{e}^-/\text{p/s}$
- 101 dB dynamic range
- Rolling and true global shutter
- Hardware, electronics, sensor and software developed by Teledyne

TYPICAL APPLICATIONS

- Ground-based astronomy
- Exoplanet characterization
- Orbital object tracking
- Near Earth Object characterization
- Time Domain Astronomy
- Solar Physics
- Adaptive optics
- Speckle/Lucky Imaging

RELIABILITY

- High reliability, industry-leading Citadel chamber design

Next-Generation, Large Sensor, High-Performance Camera for Astronomy

The Teledyne COSMOS camera merges CCD and CMOS performance, resulting in a new generation of camera distinct from anything else currently on the market. The COSMOS camera excels in several key areas: resolution, pixel size, sensitivity, and speed. Notably, it is the only large format, high performance CMOS camera designed and manufactured entirely within a single source, at Teledyne.

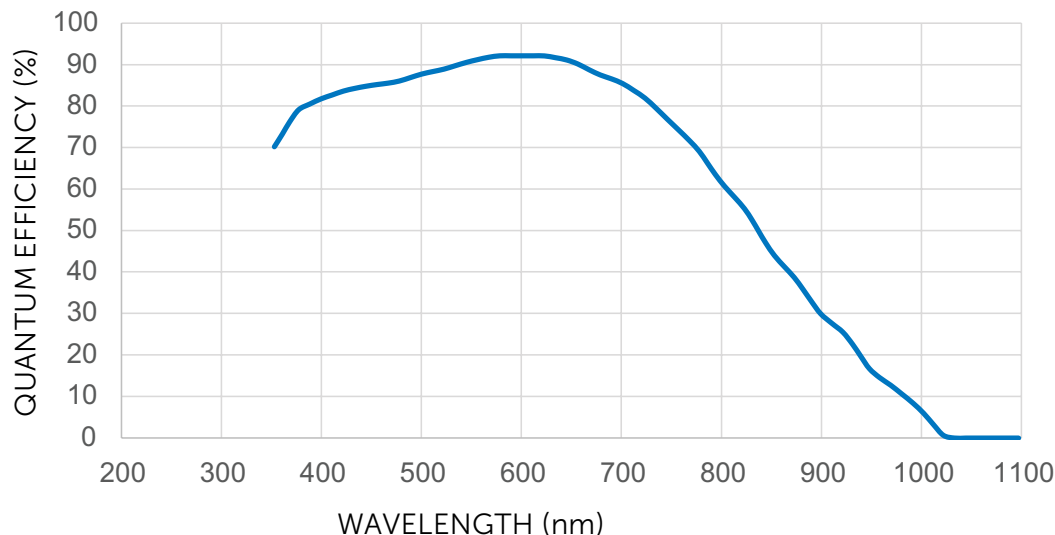
Teledyne Imaging has a history of providing solutions for world-changing projects, including the Mars Rover missions, ground-based observatories, and the James Webb Space Telescope. The COSMOS camera, leveraging its large area CMOS technology, stands as the ultimate solution for astronomy and more.



COSMOS-3k SPECIFICATIONS

SPECIFICATIONS	Camera Performance
Sensor	Back illuminated, grade 1, 100% fill factor
Active Array Size	3264 x 3264 (10 megapixels)
Pixel Area	10 x 10 μm (100 μm^2)
Sensor Area	32.6 x 32.6 mm (46 mm diagonal)
Peak QE%	> 90% peak QE
Spectral Response	200 – 1050 nm
Full Well Capacity	~ 14ke ⁻ (typical, high gain), > 100,000 e ⁻ (typical low gain)
Read Noise	< 1.5 e ⁻ RMS (typical, high gain mode), < 1 e ⁻ RMS (typical, CMS mode)
Dark Current	< 0.05 e ⁻ /p/s (typical)
Cooling Method	Thermoelectric with air and liquid circulation (external chiller required for liquid cooling)
Cooling Temperature	< -25 °C (guaranteed)
Data Interfaces	CoaXPress® (Teledyne PCIe frame grabber card included)
Bit depth	14-, 16-, and 18-bit
Readout Modes	Rolling and true global shutter
Max Exposure Time	> 1 hour
Window Material	Calcium Fluoride (CaF ₂) glass, broadband AR coatings standard
Operating Temperature Range	-30°C to 30°C (liquid); -10°C to 30°C (air) relative humidity: ≤ 90% (non-condensing); altitude: 0-4500 meters
Camera Weight	11 kg
Camera Dimensions	14 x 14 x 20 cm
Nonlinearity	< 1%
Binning	2 x 2 and 4 x 4 (on FPGA)
I/O signals	Three MCX connectors: 2x software configurable outputs, 1x trigger input
Certification	CE

COSMOS-3k QE CURVE



COSMOS-3k READOUT MODES AND PROPERTIES

HDR: High Dynamic Range Mode; CMS: Correlated Multisampling

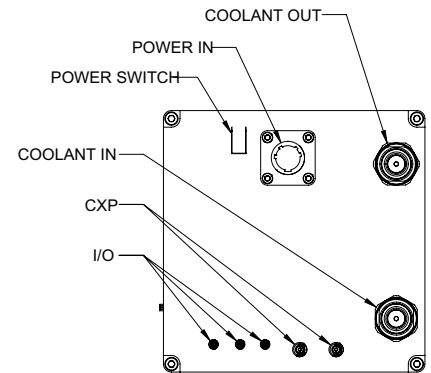
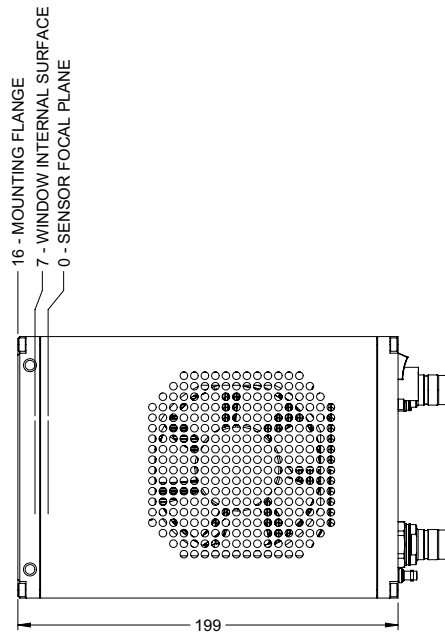
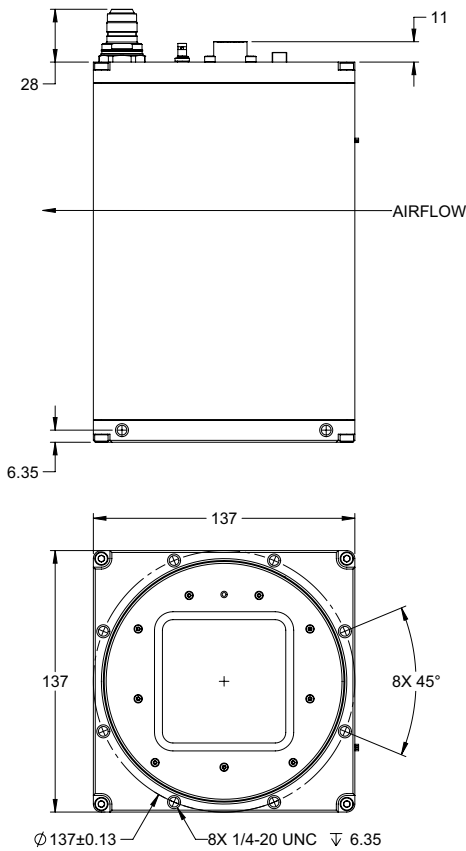
Data	Gain Setting	Shutter Mode	Read Noise (e ⁻)*	Frame Rate (fps)
16 bit	High – CMS 8x	Rolling	< 1	2.0
14 bit	High	Rolling	1.4	56
14 bit	High	Global	2	46
16 bit	Low	Rolling	6	19
16 bit	Low	Global	11	15
18 bit	HDR	Rolling	1.2	7.2

* Typical values

COSMOS-3k SPEED TABLE

Frame Rates (frames per second)

Region of interest size (pixels)	14-bit (rolling shutter and global shutter)	16-bit (rolling shutter – CMS)	16-bit (rolling shutter)	14-bit (global shutter)	16-bit (global shutter)	18 bit (HDR)
3260 x 3260	56	2.0	19	46	15	7.2
3260 x 2048	89	3.2	30	73	24	11
3260 x 1600	114	4.1	39	93	31	14
3260 x 1024	178	6.4	61	146	48	22
3260 x 512	350	12	120	288	96	45
3260 x 256	683	24	233	566	189	88

DIMENSIONAL OUTLINES (Unit: mm)

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Specifications in this datasheet are subject to change.
 Refer to the Teledyne Space Imaging website for most
 current specifications.

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