

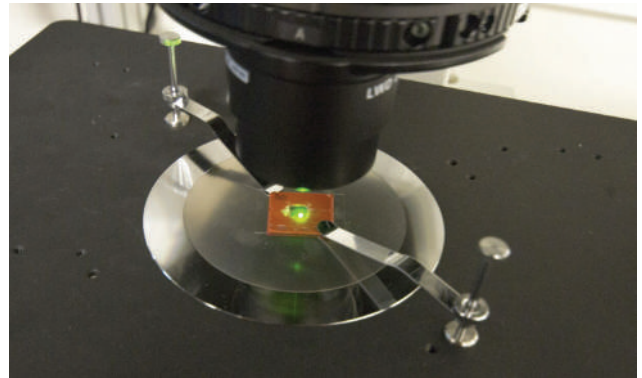


## OCAM<sup>2</sup>S

### Data Sheet

July 2015

FAST LOW LIGHT, LOW NOISE ELECTRONIC SHUTTERED  
**SCIENTIFIC CAMERA**



### MAIN FEATURES

- Embedded Electronic Shutter
- Internal or External Trigger modes
- Single, Burst, Sweep triggering
- Sub-electron readout noise\*
- Up to 2067 FPS Full Frame
- 95% peak QE typical
- Ultra-low latency CameraLink™ Full interface : 43µs
- 3700 fps in 2x2 binning mode

### OTHER FEATURES

- 240 x 240 pixels state of the art EMCCD
- Wide 24 µm pixels
- 14 bits precision A/D converter
- Cooled operation for low dark current
- Integrated cooling temperature controller
- Fully sealed resistant aluminum body with low thermal gradient
- Clock & trigger input / output for synchronous operation
- Custom design and Read Out Modes available upon request

\* With EMCCD Gain



# THEORY OF OPERATION

**OCAM<sup>2</sup>S** is a high speed low noise camera with an integrated electronic shutter able to run at 2067 fps with sub-electron readout noise. To achieve this performance, **OCAM<sup>2</sup>S** uses the **E2V CCD 219 EMCCD**, an 8 output split frame transfer **CCD**. To minimize smearing, the **CCD219** high speed metal buttressed clock lines are driven by **OCAM<sup>2</sup>S** at a speed as high as 7 Mlines/s transferring each frame in the store section in only 12 microseconds.

The Embedded Electronic Shutter in **OCAM<sup>2</sup>S** is able to deliver an arbitrary number of integration pulses that can be shorter than 1µs with a precision better than 50ns. Contact us for more details.

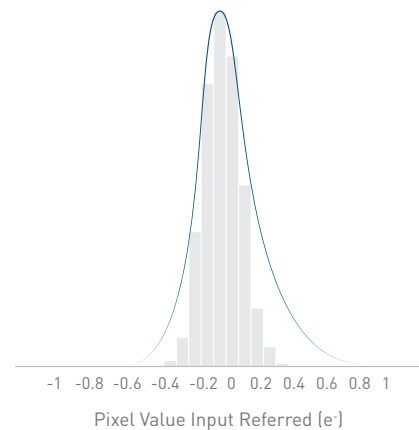
**OCAM<sup>2</sup>S** also offers an extremely low latency: 43µs between exposure and first pixel availability.

## OCAM<sup>2</sup>S WITH CCD219 TYPICAL PERFORMANCES

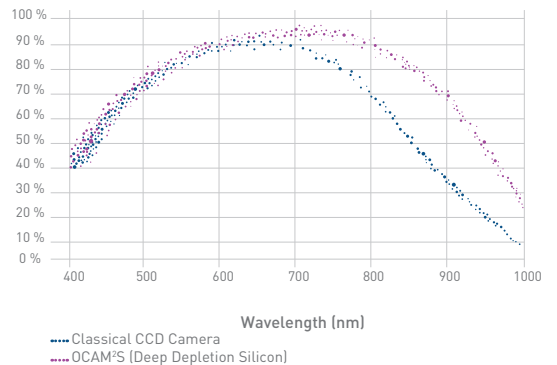
Test measurement	Result	Unit
Minimal Pulse Width	<1	µs
Extinction ratio	>1000	N/A
Shutter Resolution	<0.05	µs
Mean readout noise at 2067 fps and multiplication gain ~600	0.3	e <sup>-</sup>
Quantization	14	bits
Dark signal at 2067 fps at -45°C	<0.01	e <sup>-</sup> pixel <sup>-1</sup> frame <sup>-1</sup>
Detector Operating Temperature	-45	°C
Peak Quantum Efficiency at 650nm	95	%
Linearity at gain x1000 from 10 e <sup>-</sup> to 150 e <sup>-</sup>	<3	%
Linearity at gain x1 from 15,000 e <sup>-</sup> to 150,000 e <sup>-</sup>	<3	%
Image Full Well capacity at gain x1, 2067 fps	100 000	e <sup>-</sup>
Parallel CTE at gain x1, 2067 fps	>0.99995	N/A
Serial CTE at gain x1, 2067 fps	>0.99994	N/A

\* With EMCCD Gain.

NOISE HISTOGRAM FOR GAIN x1000



TYPICAL QUANTUM EFFICIENCY, NO WINDOW, AT 228°K  
CCD219 QE at -45°C Basic ER1

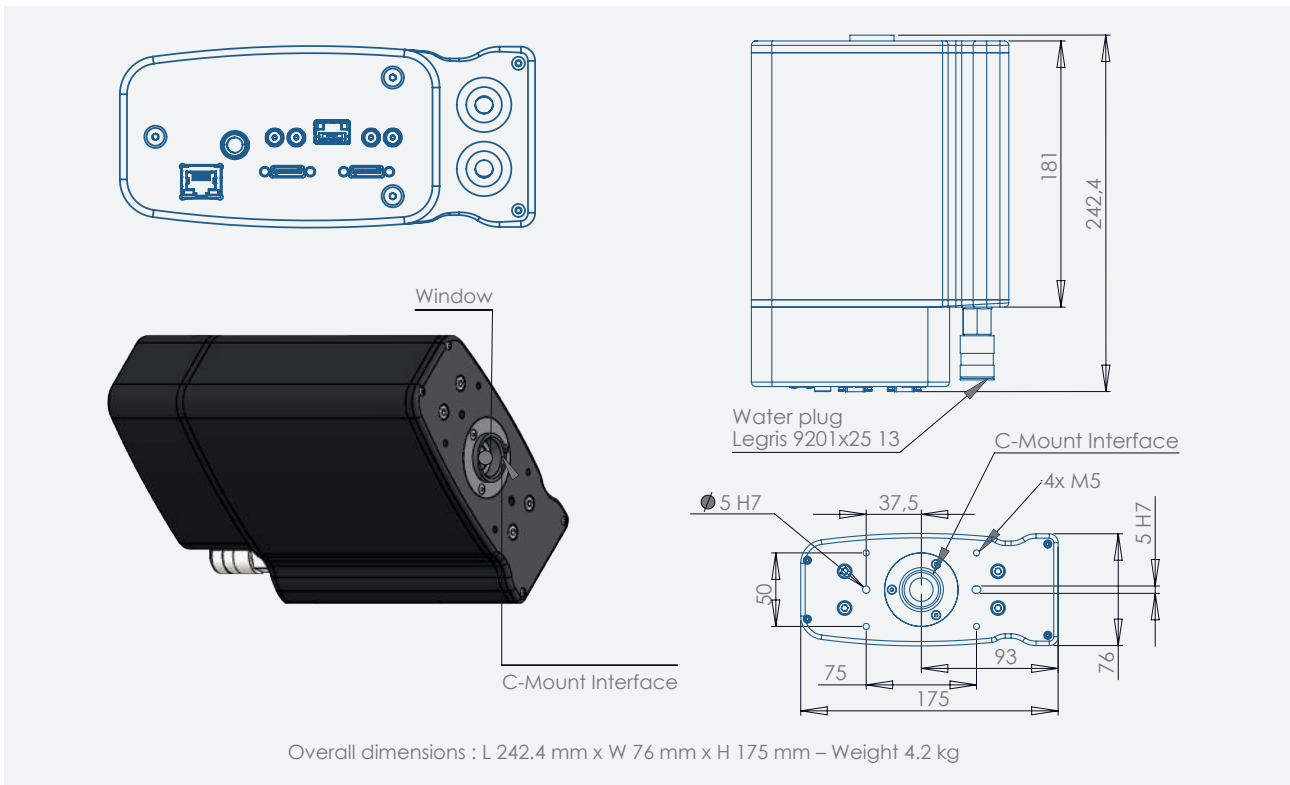


## WAVEFRONT SENSOR OPTION

Microlens array specifications (standard proposal, customizable on request)	Result	Unit
Focal length (distance to maximum intensity) @ 633nm	22	mm
Number of sub-apertures	20 x 20	N/A
Lens shape	Square	N/A
Lens pitch	288	µm
Lens clear aperture	>286	µm
Lens array position on substrate	Centered	N/A
Fill factor	>98	%



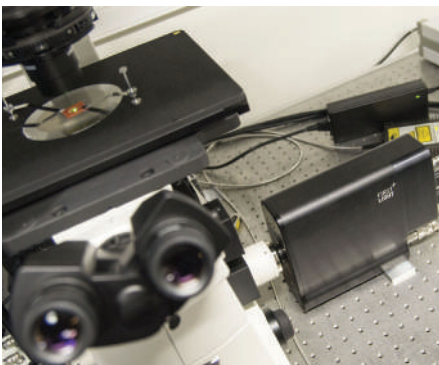
# OCAM<sup>2</sup>S



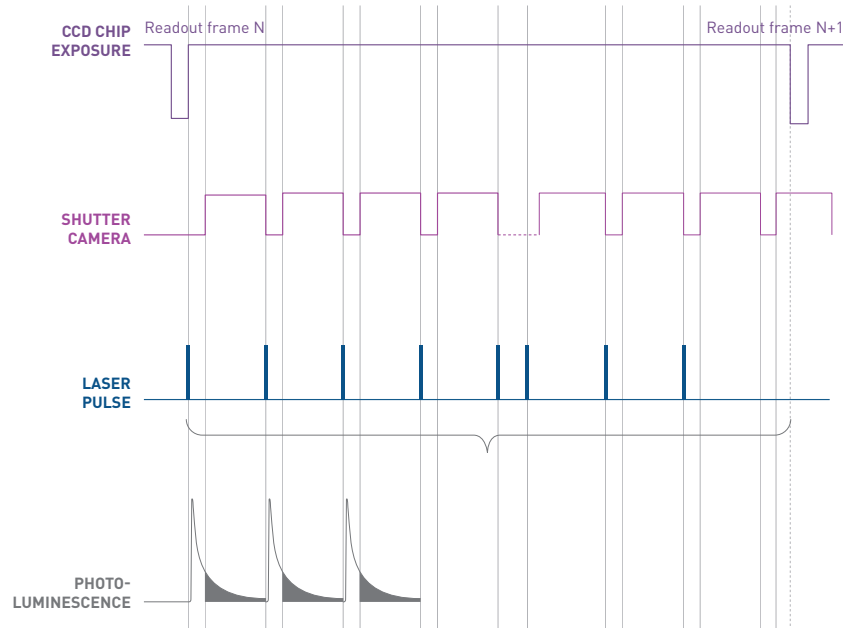
## APPLICATIONS

OCAM<sup>2</sup>S can be used in various fields:

- Adaptive Optics for Astronomy
- Fluorescence Microscopy
- Cellular Microscopy
- Laser pulsed applications



Fluorescence Microscopy



Chronogram



## OUR CUSTOMERS AND PARTNERS

Today, world leading institutes and manufacturers on 4 continents have given us their trust, and we are proud to count among our partners and clients:



## OUR COMPANY

First Light Imaging designs and manufactures state of the art scientific cameras that combine extreme sensitivity and high speed for both visible and infrared spectra.

Coming from european academic research institutes, already multiple award-winning, First Light Imaging is recognized for the high performance of its products.

We develop our cameras around cutting-edge sensors. EMCCD or e-APD, we integrate the most challenging, difficult to harness detectors in complex optics systems.

Already at the heart of the Adaptive Optics systems for the world's biggest telescopes, our technology and detectors are also used in Medical Imagery, Defense, and Industry.

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