

Camera specifications

Two numbers of low speed CCD camera with normal resolution 1392*1040 Pixel are required to perform imaging experiments at NCCRD, IIT Madras, and at ISRO Propulsion Complex, Mahendragiri. The proposed camera units will be a part of a laser diagnostic test facility that is being developed currently. Detailed specifications of the camera are listed below.

Table. 1. Detailed specifications of the camera

S/no	Camera Specification	Requirements
1	Max. frame rate	$\geq 7.3/13.5$ fps (12/25 MHz, normal) 11.7/21.6 fps (12/24 MHz, center)
2	Pixel resolution	1392 x 1040 pixel (normal), 800 x 600 (center) preferred
3	Pixel size	$\geq 6.45 \mu m \times 6.45 \mu m$
4	Exposure/ shutter time	1 micro second – 60 s
5	Dynamic range	$\geq 2500: 1 (> 68 \text{ dB})$; 4000: 1 (72 dB, binning)
6	Dynamic range (A/D)	14 bit
7	Spectral range	$\sim 250 \text{ nm} - 1000 \text{ nm}$
8	A/D conversion factor	1.0 e-/count
9	Pixel scan rate	$\geq 12 \text{ MHz}/24 \text{ MHz}$
10	Pixel data rate	$\geq 19.5 \text{ Mpixel/s}$
11	Binning (hor x ver)	1 x1 to 4 x 4
12	Non linearity	< 1%
13	Trigger input signals:	software/TTL level
14	Trigger output signals:	3.3 V LVTTTL Level
15	Smear	<0.002 %
16	Anti-blooming factor	> 400 (standard 100 ms exposure) >4(NIR boost 100 ms exposure)
17	Power supply	9...28 VDC (12 VDC typ.)
18	Optical interface	C-mount (C to F mount adapter should be included)
19	Sensor type	Monochrome CCD
20	Image sensor	ICX285AL
21	Spectral range	290 nm ... 1100 nm
22	Shutter mode	Global(snapshot)
23	Quantum efficiency	62 % @ peak
24	Dark current	1 e ⁻ /pixels @ 23° C
25	Data interface	USB 2.0 or above

26	CE certified	Yes
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Additional requirements:

1. The camera should be capable of acquiring images with a low noise at 5-7 e⁻ ms @ 12 MHz (typ.) and 6-8 e⁻ ms @ 24 MHz (typ.)
2. The camera should be capable of operating within a temperature range of + 10 ° C to + 45 ° C and should be functional in the relative humidity range of 10 % to 80 %.
3. The power consumption should be less than 4 W.
4. For the camera control, image acquisition and archiving of images in various formats, a software application has to be provided.
5. A camera SDK (software development kit) including a 32/64 bit dynamic link library for user customization and integration on PC platforms should be available in the scope.
6. All the camera functions should be remotely accessed and controlled via digital interface.
7. Original manufacturer name and product details must be mentioned in the technical document.

Optional:

1. Quote for 1st year and 2nd year AMC beyond warranty.

Optional item may be considered for finalisation of L1 Vendor if the optional items are chosen for purchase.

Terms and conditions:

The cameras intended to be purchased is for integration with an equipment to be supplied by IIT Madras to ISRO Propulsion Complex, Mahendragiri, Tirunelveli District, Tamil Nadu.

1. Supply should be made within 6 weeks of release of purchase order
2. Warranty service must be provided on-site at IIT Madras and ISRO Propulsion Complex, Mahendragiri, Tirunelveli District, Tamil Nadu for duration of warranty period.
3. Annual Maintenance contract should be applicable for ISRO Propulsion Complex, Mahendragiri, Tirunelveli District, Tamil Nadu
4. Vendors should provide continuous technical support and maintenance of equipment during warranty period.
5. The OEM or the vendor representing an OEM must have at least 3 years experience in manufacturing/marketing camera equipment.
6. Vendors must have sufficient experience in supplying equipment to reputed organisations for research purpose. Experience of the end users will also be used as a criterion for the selection of bids that meet technical requirements. List of reputed end users inclusive of educational institutions in India (at least 3) to whom supplies made with client contact details should be furnished.
7. All equipment must be compatible with Indian electrical standards and

codes.

8. Cost breakup for all modules included in the scope of supply is mandatory.
9. Non-OEM suppliers must submit a tender specific authorization from the OEM for supply to IIT Madras.
10. Vendors must provide detailed documentation for the equipment.
11. Vendors must provide training to our technical staff for using the equipment, free of cost.
12. Vendor must have permanent service representative stationed in India.