



Indian Institute of Technology, Kanpur  
Department of Aerospace Engineering

Inquiry no: AE/ACM/2016/CCD-ETC  
Date of Opening: July 25, 2016  
Date of Closing: August 7, 2016

**Subject:**

Sealed quotations for the supply of CCD Camera, Tilt and shift lens, LED Illuminator for PIV application as per the following specifications.

**Specifications:**

**1. Camera – 1 Number**

<b>Application:</b>	Particle Image Velocimetry (PIV)
<b>Dynamic range A/D:</b>	$\geq 12$ bit, Monochrome
<b>Minimum Resolution:</b>	8 Megapixels
<b>Pixel size:</b>	$< 6\mu\text{m}$
<b>Quantum efficiency:</b>	$> 48\%$ @ 532 nm
<b>Operational mode:</b>	Single and double frame modes
<b>Maximum frame rate:</b>	$\geq 10$ fps (at full resolution in double frame mode)
<b>Exposure time:</b>	should be adjustable, minimum: $5\mu\text{s}$ or less
<b>Inter framing time:</b>	300 ns or less
<b>Triggering:</b>	The camera should have an option of external triggering using a TTL signal.
<b>Software:</b>	Software for controlling the camera (like exposure time, trigger mode, resolution, single or double frame modes, pixel binning, ROI, acquiring and saving images to a hard disk etc.)
<b>Camera interface:</b>	Please include necessary hardware for camera interface such as frame grabbers, connecting cables etc.
<b>Optical interface:</b>	F-mount
<b>Operating temperature &amp; humidity:</b>	$10^{\circ}\text{C}$ to $45^{\circ}\text{C}$ & 10% to 90% RH.



## 2. Tilt shift lens- 2 Numbers

<b>Application</b>	Stereoscopic PIV - suitable for Scheimpflug adjustment
<b>Mount type</b>	F mount
<b>Focal length</b>	85 mm
<b>Minimum focusing distance</b>	390 mm
<b>Capability</b>	Wide tilt and shift capability
<b>Tilt range</b>	$\pm 8.5^\circ$
<b>Shift range</b>	$\pm 11.5$ mm
<b>Aperture</b>	<b>Maximum:</b> f/2.8. <b>Minimum:</b> f/32
<b>Number of lens elements/groups</b>	6/5
<b>Filter size</b>	77 mm
<b>Maximum Reproduction Ratio</b>	1:2 (0.5)

## 3. LED light source – 1 Number

<b>Application</b>	PIV, Schlieren/Shadowgraphy, BOS
<b>Output wavelength</b>	Green ( <b>Dominant wavelength 528 nm</b> )
<b>Control mode</b>	Both manual and software control
<b>Operating mode</b>	Continuous and Pulsed
<b>Sub modes in pulsed operation</b>	Single and Double (for PIV) pulsed
<b>Pulse repetition rate</b>	> 1000 Hz
<b>Pulse width</b>	200 ns to 300 $\mu$ s
<b>Delay between first and second pulses in PIV mode</b>	0 to 100 ms in steps of 1 $\mu$ s or less
<b>Triggering capability</b>	Both internal and external (TTL) in both continuous and pulsed mode
<b>Output Trigger</b>	TTL
<b>Accessories</b>	Projection lens (18 cm and 36 cm diameters light spot from 1m distance)



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**Kindly Note:**

1. All quotations must reach the undersigned by **07 August 2016**.
2. A copy of authorization letter is to be submitted from OEM.
3. Quotation must be valid for 60 days.
4. Desired warranty period: 2 years.
5. All the technical details should be attached along with the quote.
6. Please include any other required accessories, power supply, cables (of length at least 3m) etc.
7. Include maximum educational/academic discounts, if any.
8. The price should be Ex-works and FCA.

**Address for the quotation:**

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