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Last Date: March 10th, 2013

Enquiry for (i) Time Resolved Particle Image Velocimetry (TRPIV) and (ii) Phase Doppler Interferometer (PDI) to be used for investigations in Single Cylinder Optical Research Engine with Given Specs

Engine Specifications

Engine Type	AVL5402
No of Cylinder	1
Cylinder bore/stroke	85/90 mm
Swept Volume	510.7 cc
Compression Ratio	17.5
Maximum Power	7 kW
Rated Speed	4200 rpm

Sealed quotations are invited for the purchase of following items with detailed specifications given below:

1. Time resolved Particle Image Velocimetry (TRPIV) (1 No.)

2. Phase Doppler Interferometer (PDI) (1 No.)

Detailed Specifications:

1. ***Time resolved Particle Image Velocimetry (TRPIV)*** for Optical Engine with features such as

- Crank angle based triggering system
- Adaptive PIV for automatic selection of Optimum shape/ size of the interrogation windows
- Time-resolved sum of correlation for increased vector stability

Suggested Hardware

a) Double cavity high speed laser (Sealed laser head, Class-4 Laser)

Pulse energy: Minimum 2 x 22.5 mJ @ 1000HZ, Output Wavelength = 527-532 nm,

Beam Diameter = Min. 3 mm, Max. Frequency = 20 kHz per cavity

b) Laser beam steering

3 adjustable, high reflection mirrors for 532 nm and 355 nm including housing

c) Light sheet optics for 2 different divergences f = - 10 mm and f = - 20 mm

Angle of divergence approximately 30° and 15°,

Adjustable focus 0.3 – 2 m

d) Laser sheet collimator optimised for 532 nm, collimated sheet height about 8x laser beam diameter, max 50 mm

Rails and posts for mounting optical components

e) Synchronization of PIV systems with engine crank angle using high speed controller with rotary encoder/ decoder (Software controlled; capable of enabling multiple high speed camera support, highly accurate timing, non-ambiguous definition of 1st and 2nd frame for PIV application, free choice of image rate, includes crank angle counter for engine application, generated a TTL trigger at adjustable crank angles for crank angle synchronous recording of image series and pressure signals with an A/D converter)

f) High Speed CMOS Camera

1024 x 1024 pixel, Max. fps = 2 kHz @ full resolution (minimum), 12 bit, 8/16 GB memory module, GigaBit Ethernet interface

g) Camera mountings, Tripods, Appropriate Camera lenses (50mm, F/1.4 suggested), adapter ring sets for camera lens compatibility,

h) Software module for high speed camera, Image acquisition and data processing (64 bit)

i) 2D PIV software module for high resolution PIV image interrogations, with capabilities to do 3D stereo PIV and Tomographic PIV

j) System setup package consisting of appropriate rails and posts for optical components, cables and accessories.

k) Data storage and processing unit (State-of-the-art system), 25" monitor

l) Appropriate seed generator for engine applications

m) All essential hardware (including the ones not listed but essential for system operations) for making engine measurements for TRPIV

n) Supply of essential consumables for three years.

o) Integration, Project management & documentation, Installation on the optical engine and successful demonstration at ERL, followed by comprehensive training module spread over one week.

2. ***Phase Doppler Interferometer (PDI) System*** for Optical Engine with

a) 2D/ 3D PDI Transmitter

b) 500mW green and 200mW blue diode pumped solid state laser, 6m+ long cables, 2D sliding base, EFL lens 82 mm dia x 350 mm

c) 2D/3D PDI Receiver

Multi-aperture, 4D base, 6m+ cable, EFL lens 100 mm dia x 500 mm, including automated mask changer

d) Advanced signal analysers for (i) size and velocity processing, and (ii) Velocity processing

e) Automated instrument management system software

d) Power box

e) Data Management system

f) 3-Axis motorized Camera Traverse: 600 x 600 x 600 mm, motor controller, mounting brackets, AIMS integrated, Detail specs TBD

g) Size and velocity processor and all appropriate softwares

h) System setup package consisting of appropriate rails and posts for optical components, cables and accessories.

i) Data storage and processing unit (State-of-the-art system), 25" monitor

j) All essential hardware (including the ones not listed but essential for system operations) for making engine measurements for PDI

k) Integration, Project management & documentation, Installation on the optical engine and successful demonstration at ERL, followed by comprehensive training module spread over one week.

Terms & Conditions:

(i) Prices should be FOB.

(ii) Warranty should at least be three years after the installation.

(iii) Validity of quotation should be at least for 90 days.

(iv) The company should be able to operate system at IITK and demonstrate its functioning and experiments. The scope of supply will include anything else, which is essential to operate the TRPIV and PDI on specified engine.

Eligibility Condition:

(i) The firm must have supplied at least one set of TRPIV and PDI system for engine applications. Kindly send PO for the same as proof of reference.

(ii) The firm must have service and support infrastructure in India and must be prepared for online support in-addition.

Kindly send your best offer (Techno-Commercial offer) so as to reach us on or before March 10th, 2013 to the following address :

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