Corrigendum-2 dated 04.10.2018
For Three (3) Tenders

No: 1 => Ref. No: IIT/OTG1/CoE_AMT/DHI/2018/EQ1, dated 28/09/2018

For the supply, unloading, installation & commissioning, and training of A VIBRATION SENSOR (Robot Assisted) FACILITY

Details	Date Published in the Tender	Revised Date
Last Date and Time for submitting the tender document	22.10.2018 (Monday) at 10:00 Hrs. (IST)	**22.10.2018 (*Monday*) at 15:00 Hrs. (IST)**
Time and Date of Opening of Technical Bids	22.10.2018 (Monday) at 11:00 Hrs. (IST)	**22.10.2018 (*Monday*) at 15:30 Hrs. (IST)**

The table below specifies the additional points in sections ***"A. Hardware requirements", "B. Robot requirements",*** *and* ***"F. Unloading, installation and training"*** and revised section ***"C. Software requirements"*** of the above mentioned tender document.

The bidder must mention point-wise technical compliance of all the specifications mentioned in the tender documents (*old and corrigendum*).

A. Hardware requirements	
• Electronics for decoding the high frequency signals from the interferometer must be included in the system. It can be connected with the scanning heads and to the reference signals, synchronization, triggers, and gate for measurement control. It must comprise of 3 digital wide bandwidth decoder featuring 14 ranges:	
✓ Bandwidth: 100 kHz	
✓ Tracking filter featuring three sensitivity ranges for optimizing the signal to noise ratio with weak return signals	
✓ Integrated data acquisition with 24 bit resolution and signal generator	
✓ Fully digital transmission of data via an Ethernet connection to the data management unit.	
• Reference object supporting for a precise 3D alignment of the scanning heads must be included. It must have precisely machined and marked reference points with engraved coordinates and a well balanced distribution of these marks in 3D space in order to have a basic alignment of the measurement system.	
• **Scanning head details**	
Laser type	He-Ne; 633 nm; < 1 mW output power

Eye safe class	II
Scan angle (H x V)	50^o x 40^o
HD video camera	With 20X optical zoom
Field of view	55^o x 32^o
Closest measurement distance	125 mm

- A chassis type of vibrometer controller equipped with 2 handles on the front panel as well as additional flange for mounting in 19 inch racks.
- A branded high resolution TFT monitor with high viewing angle for convenient working environment (24 inch or better, and 16:10 aspect ratio or more).
- The facility must have a state-of-the-art work-station with 21-inch or higher screen (or a laptop with 15-inch screen) of 64-bit configuration with 1 TB or higher disk space, 32 GB or more RAM, and a suitable operating system (pre-installed and activated). Along with this, it must have DVD recorder, Gbit-LAN, graphics board, wireless optical mouse and keyboard. The computer must be a branded (Apple/Dell/HP/Lenevo) one.
- Cabinets for housing the PC, scanning heads, cables, controller, tripod and all other accessories must also be provided. The cabinet must be flexible to split into sections for easy handling.
- The system must include an integrated arbitrary signal generator.
- A junction box for connection and power supply to the three scanning heads.

B. Robot requirements

Robot must be equipped with necessary sensor to avoid obstacles (presence of dynamic obstacles) and collision during its operation.

C. Software requirements

The robot assisted scanning laser vibrometer facility must be provided with the necessary software for supporting the following features:

- Vibrometer controller with basic software maintenance system.
- The vibrometer software must also include data acquisition, and data analysis standard features:
  - ✓ Remote control of all scanning head features (leaser auto focus, scanning angles, and camera).
  - ✓ Real time HD video display
  - ✓ 2D and 3D alignment to define the coordinate system.
  - ✓ Measurement grid definition by intuitive drawing tools.
  - ✓ AC and DC coupling.
  - ✓ Various internal and external trigger functions.
  - ✓ Various averaging functions.
  - ✓ Synchronized signal generator.
  - ✓ Automatic calculation of the phase relation between scanned points from a predefined reference channel.
  - ✓ Digital filters for real time integration and differentiation.
  - ✓ Signal enhancement and speckle tracking.

✓ Spectral density analysis and analysis of spectra and time tracers for all three measurement directions. ✓ Display of magnitude, phase, real and imaginary part. ✓ Calculation of FRF, H1, H2, AP, CP, ESD, PSD and coherence analysis. ✓ Frequency or band selective 1D and 3D animation in frequency domain. ✓ ODS animation in pseudo colors or as video image skin. ✓ Animated profile cuts. ✓ Point index (editable). ✓ Various export filters for data, animation and graphics.
• The system must include software for generating complex measurement grids and focus assignment. It will be used for assigning dedicated focus values to different points of the measurement grid. This consists of basic geometries like polygons, hexagons, circles, and arbitrary points. It must also include functions for grouping, point density, coarsening, refining, manipulation of edge points etc.
• The system must allow a high resolution, i.e. 512 x 512 or better scan point density across the viewing area. Along with this, it must include fast scan routine for single frequency vibration measurements.
• User defined (course/fine) scan grid setting with manual and optical distance sensor.
• The distance sensor must be included for coordinate measurements via the scanning mirrors (reproducibility: ± 1.5 mm; high dynamic range to cope up with surface reflectivity changes with filtering or surface preparation).
• 3-D data acquisition user defined, and automated storage settings. It will be responsible for the alignment, positioning, and simultaneous control of the three laser beams on the test object.
• Image construction from grid points, and tailoring of images, and animations of vibration analysis.
• Import and export of data/images for extended/remote analysis.
• 3D time domain and frequency domain display of data and analysis of the image.
• The system must include facility for 12,800 FFT lines. In addition, it must have facility for extending the same.
• Software for defining signal generators (output) with sine, chirp, random, ramp etc. (output voltage: ± 10 V; maximum output current: ± 5 mA; maximum signal frequency: 250 kHz; user defined signals, linearization by an amplitude correction file; and uncorrelated signals for MIMO measurements).
• Online software help for operation and troubleshooting the vibrometer system.
• Data acquisition setting software for synchronized measurements of working parameters such as surface vibration, excitation etc.
• Automatic alignment of laser spot in grid points using image processing by video triangulation. Necessary accessories like video camera and others must be included for this.
• Ability to measure, store, and generate animations to display the time domain data in user selectable playback speeds. The processor must also be able to convert the time domain data into frequency domain and use the same for animation.
• Signal averaging function must be available in both time domain and frequency domain measurements.
• The facility must be able to measure the geometry of measurement object at exact same points of the measured vibration points.

- The provided operating system must be licensed with a hard copy of the software backup.
- Datasets can be exported to modal analysis package for further post processing.
- Licensed software for controlling the robot for full field measurement and stitching of the data.
- Coherence optimizer must be provided to have controlled laser frequency stabilization, avoiding stand-off distance dependent optical sensitivity changes and expands the available velocity range.
- Software for controlling the scan angle must be included.
- Suitable facility must be provided to connect the scanning head with the electronics.
- The facility must include software for analysis and calculation of the principal components for MIMO measurements.
- Necessary software for retrieval of the data through external applications.
- Software for external control for start and stop of a measurement.
- Suitable facility for listening into the structural borne noise signal of a scan point to identify noise sources.
- Module for importing the geometry data in a universal file format to the PSV software for defining the scan points.
- Module for transforming the scanning data into universal file format data file.
- Module for post processing of the scanned data.
- Software for robot control
- Components required for the station:
  - ✓ Control software.
  - ✓ Head assembly for 3 scanning heads.
  - ✓ Installation of cable sockets on robot foot plate including installation kit.
  - ✓ Set of three interconnecting cables of 20 m each.

F. Unloading, installation, and training

The bidder must take care of the unloading, installation, and commissioning of the entire unit at IIT Kharagpur.

Extensive training shall be provided to IIT- Kharagpur scholars by the supplier at IIT Kharagpur. The training should cover complete operation, application software usage in all aspects of measurement and data analysis, part programming, robot programming, calibration, preventive maintenance and trouble shooting.

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No: 2 => *Ref. No:* IIT/OTG2/CoE_AMT/DHI/2018/EQ2, dated 28/09/2018

For the supply, unloading, installation & commissioning, and training of A LINEAR TORSION SERVO HYDRAULIC FATIGUE TESTING SYSTEM

Details	Date Published in the Tender	Revised Date
Last Date and Time for submitting the tender document	22.10.2018 (Monday) at 10:00 Hrs. (IST)	**22.10.2018 (*Monday*) at 15:00 Hrs. (IST)**
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No: 3 => Ref. No: IIT/OTG/CoE_AMT/2018/AGP, dated 25/09/2018

For the supply and fabrication of Aluminum-Glass Partition

Details	Date Published in the Tender	Revised Date
Last Date and Time for submitting the tender document	22.10.2018 (Monday) at 10:00 Hrs. (IST)	**22.10.2018 (*Monday*) at 15:00 Hrs. (IST)**
Time and Date of Opening of Technical Bids	22.10.2018 (Monday) at 11:00 Hrs. (IST)	**22.10.2018 (*Monday*) at 15:30 Hrs. (IST)**

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End

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