Tender No.IITT/MECH/08/2019-20/22   20 December2019

NOTICE INVITING TENDER FOR SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF DATA ACQUISITION SYSTEM, HIGH SPEED CAMERA WITH ACCESSORIES (E-PROCUREMENT MODE ONLY)

Indian Institute of Technology Tirupati (IIT Tirupati) invites online bids (e-tender) in Two part bid system from reputed **OEM / authorized distributors / authorized dealers for** the following:

Item Description	Quantity (approx.)	Estimated Cost (Rs.)	EMD (Rs.)	Tender Fee (inclusive of all taxes in Rs.)
Data acquisition system (DAQ) with accessories	01 No	15,00,000/-	2,50,000/-	1500/-
High speed camera with accessories	01 No	35,00,000/		
Total	**02 Nos**	**50,00,000/-**	**2,50,000/-**	**1500/-**

The Tender Document can be downloaded from Central Public Procurement (CPP) Portal http://eprocure.gov.in/eprocure/app and bid is to be submitted online only through the same portal up to the last date and time of submission of tender.

Critical dates of tender:

1	Date and time of Online Publication/Download of Tenders	20.12.2019	15.00 hours
2	Bid submission start date & time	20.12.2019	15.00 hours
3	Bid submission close date & time	08.01.2020	15.00 hours
5	Opening of Technical bids	09.01.2020	15.00 hours

1.   About IIT TIRUPATI:

Indian Institute of Technology Tirupati (IIT Tirupati) is an Autonomous Institute under Ministry of Human Resource Development, Govt. of India.

2.   Technical Specifications: Schedule of requirement

a) Data Acquisition System with accessories -01 No

Scope: Data acquisition (DAQ) system should synchronize with two high speed cameras and an IR camera to monitor welding arc images, welding current and voltage waveforms. The system should be capable to record welding current and voltage waveforms in *synchronization* with arc image data from two high speed welding cameras and the thermal profiles from the IR camera. The system will be used to study metal transfer/observations of molten droplets, and arc phenomena during welding process.
Specifications:
High Voltage Input – 3 in number
Input type: Differential
Number of channels per input module: 3 channels per card.
Voltage input range: +/- 1600V or above
Protection class: CAT III 600 V or better; CAT II 1000 V or better
Input protection: In+ to In-: 1.8 kVrms or above
Input impedance: Better than 10 M ohm
CMRR: ≥85dB @ DC to 50Hz or better
DC accuracy (including gain accuracy and offset accuracy) : ≤ ± 0.05%±50mV FSO or better
Gain stability over temperature: ≤ 50ppm / deg C or better
Filter type: Low Pass 6 pole or more Bessel/ Butterworth and better
Filter implementation: Analog / Digital
Filter (low pass) - 3 dB cut off frequencies: 10Hz to 100kHz. Programmable through software
Isolation: Between Input, Output, Power supply and between channels. Isolation voltage: 1000V continuous and above.
Low Voltage input – 4 in number
Input type: Differential with Isolated Excitation
Number of channels per input module: 4 channels per card.
Voltage input range: +/- 100V
Common Mode Voltage: +/- 500V
Input protection: >=100V
Input impedance: Better than 10 M ohm
CMRR: ≥70dB @ DC to 50Hz@100V range or better
DC input accuracy: ≤ ± 0.05%+100uV FSO or better
Gain stability over temperature: ≤ 50ppm / deg C
Filter type: Low Pass 6 pole or more Bessel/ Butterworth or better
Filter implementation: Analog / Digital
Filter (low pass) -3 dB cut off frequencies: 10Hz to 100kHz. Programmable through software
Isolation: Between input, excitation, power supply and between channels. Isolation voltage: 1000V continuous and above
Excitation Voltage: 2-30VDC Bipolar
Excitation Accuracy: ±0.1 % ±5 mV or better
Excitation Current limit: 200mA or better
General
DAQ system should have the capability to operate each channel with individual sampling rates

ADC: 16 bit /Channel
Sampling Rate (max): 1 Mega samples per second per channel (Variable 100Hz-1MHz) or above
Bandwidth: Up to 500kHz
Operating temperature: 0-50^0 C
Power supply: 190-230 V AC, 50 Hz
External DC input: 24V
Humidity: 10 to 95% non- condensing
Other Standards: Shock & Vibration - Vibration sweep sinusoidal as per EN 60068-2-6:2008 VIBRATION RANDOM (EN 60721-3-2: 1997 – Class 2M2) SHOCK (EN 60068-2-27:2009) or equivalent Shock 10 G peak to peak. Vibration 1.5 Grms 5-400Hz or better, on each axis.
Accessories: • Transit case for DAQ system and accessories   • Tools required for connecting the accessories in DAQ system
Additional requirement that must be provided by vendor along with DAQ system
The vendor must provide the lookup table with the current and voltage data acquired after calibrating the existing LEM current sensors with the customer. Subsequently that information will be fed into the DAQ system.
The vendor also must provide the lookup table with the current and voltage data acquired after calibrating the current sensors that will be bought by the customer even after the installation and commissioning of the DAQ system. Because this lookup table data will be fed into the supplied DAQ system. It is to be noted that the lookup table should be provided by the vendor within one week after giving the current sensors by the customer.
The vendor must provide the rigid and compact system which can provide the power supply to three existing LEM current sensors (at present with the customer) and subsequently communicating the data of the measured welding current from the current sensors to the DAQ system.
Data acquisition software for camera integration:
Complete software for data acquisition, storage, processing, data print out and analysis shall be supplied along with the items
System should be able to store measurement settings like measurement type, gain, scaling etc.
Replay of the stored data file should be possible.
Review of stored data without interrupting data acquisition and storing process.
Vendor has to establish the Synchronization b/w the two high speed cameras, one IR camera and DAQ system.
Should synchronize the high speed welding arc images and the recording welding current and voltage data from two welding power sources in real time (while performing welding experiments). **Offline synchronization alone is not acceptable.**
The acquisition software shall be capable of scanning the selected user required channels at user required sampling rate.
Channel legend, description, filter settings, type of voltage input shall be selectable by the user.
Acquisition shall start on receipt of a TTL/any level trigger signal or from keyboard function keys (manual triggering). Pre time and post time trigger settings should be available.
Should be possible to store the welding arc images (in TIFF and JPEG formats) from the recorded data at the interested frame without changing the resolution. In other words, it should be possible to store a welding arc image at a selected welding current and voltage points in the recorded data without changing the resolution at which the welding arc images are recorded.
Should be possible to convert the acquired data as a video file.
The software shall be capable of accepting input channel wise legends, description, units and calibration data constants for Engineering Unit (EU) conversion.
Reduced sample points exporting should be possible for further analysis in third party

software like text, csv, xlsx, matlab etc.
Real time or Online processing of the recording data from selected channels with user defined mathematical functions, as well as the inbuilt functions for averaging, Filtering etc. simultaneously while performing the welding experiments
Off-line processing of selected channels with user defined mathematical functions, as well as the inbuilt functions for averaging, Filtering etc. after performing the welding experiments
The provision for giving the user defined mathematical functions, and statistical analysis tools (RMS plot, Time Domain plot, waterfall plot, Average, Min, Max, Correlation, Strain Rosette etc.) shall be available for processing and analysing the recording data online (in real time) while performing the welding experiments as well as offline.
Visualization: Software should include following visual controls: • Camera, Time recorder graph, Digital Value, Bar graph, XY plots, Scope window,FFT,2D graph, 3D graph, Overload indicator etc. • It should be possible to visualize the arc images, welding current and voltage waveforms simultaneously in a single front window/screen. The window/screen should also display the welding arc frame number and the corresponding RMS welding current and voltage.
The software must support synchronizing multiple Cameras (two high speed cameras and one IR camera) with the DAQ system. The recorded high speed camera images and IR camera images must be synchronized with the recorded welding current and voltage waveforms.
The vendor should also take the responsibility of synchronizing the additional high speed camera and the infrared radiation camera procured after the installation and commissioning of the supplied DAQ system. For these additional cameras, the vendor should provide the necessary add-on/plugins, modification to the software and the necessary accessories free of charge, and should give the complete system in working condition.
If license required for software, it should be supplied free of cost, preferably perpetual license that can be installed in any PC (multiple PC's) and post processing without license.
DAQ software should have filtering options (FIR, IIR, integration, derivation) at the time of acquisition and analysis.
DAQ software should have Logical conditions (AND,OR,NOT)
Statistics (RMS, AVG; Min, MAX, Std deviation, variance) inbuilt with the software.
Software should also give the provision to feed the user defined statistical models.
Spectral Analysis (FFT, STFT, CPB) should be possible
The system should be modular, expandable and compact.
Custom data export rate should be user defined for each channels.

b) High speed camera and related accessories -01 No

Scope: The camera offered should have full hardware capable of synchronizing the high speed images of the welding arc with the welding current and voltage waveforms recording using the data acquisition system while performing the experiments. In other words online synchronization of the high speed images of the welding arc with the welding current and voltage waveforms. The required Plugins/software should be pre-loaded and integrate along with the DAQ system.
Specifications:
Resolution: 1-Megapixel or better
Sensor: CMOS Monochrome image sensor
Pixel size: $20\mu m$ x $20\mu m$ or better
Frame rate: ≥6400 fps or more at 1024 x 1024 pixels ≥700,000 fps or more at lower resolutions
Record duration: ≥ 3.5 second at 20,000 fps in full resolution
Shutter and minimum exposure time: Global electronic shutter to ≤ 0.2 µs or better selectable independent of frame rate

Dynamic Range: 12-bit monochrome
Memory capacity: 32 GB
Region of interest: Selectable in steps of ~ 128 x 16 pixels
Trigger inputs: Selectable +/- TTL 5V and switch control
Input: Trigger TTL/Switch, Sync, ready, event
Output: Trigger, sync, ready, rec, exposure
Trigger Modes: Start, end, center, manual mandatory. Mention other record options if available.
External sync: +/- TTL 5Vp-p variable frequency sync
Partitions: ≥ 63 segments to allow multiple recordings
ISO 12232 Ssat sensitivity: At least ISO 64,000 Monochrome
Trigger Options: Trigger from camera control software and external trigger using BNCs
Camera Control: High Speed Gigabit Ethernet
The camera recording should be in synchronization with the welding current and voltage data.
All necessary hardware/ software for DAQ compatibility should be quoted.
F-mount adapter (G-type lens compatible)
Lens: 300 mm f/4.5 zoom lens – F Mount/G-type lens and compatible with camera (should specify the model and make)
Tripod with 3 way head: Heavy duty tripod – upto 10 kg (should specify the model and make with complete details) Medium duty tripod – upto 5 kg (should specify the model and make with complete details)
Accessories: • 25-300mm f/4.5 lens compatible ND filters set • Padded bag for tripods • Transit case for high speed camera and accessories
Control Software: • The camera control software should be user friendly. • The camera control software should display the record parameters like frame rate, resolution, record duration, trigger mode, shutter speed etc before recording. • The camera control software should be capable to let the user review/ crop recorded video before saving. • The camera control software should have basic image processing tools like brightness, contrast, gamma. • The camera control software should have basic analysis tool to measure distances between two points and angles. • The camera control software should assist the user in focusing of image. • The camera control software should have options to correct lens distortion and camera orientation effects for better analysis accuracy • The camera control software should permit playback of multiple sequences synchronized by frame number or time to permit comparison of data acquired at different speeds
Data Download: The camera should have facility to auto download after the recording. The camera should have option of recording while download is in progress.
Operating temperature: At least up to 40 degree Celsius
Weight: ≤ 3.5 kg
Power Requirements: 100 to 240V, 50 to 60Hz AC
The vendor should specify the make and the model of the high speed camera with complete details
General:
Power supply - 190-230 V AC, 50 Hz
External DC input - 24V Dc
Operating-temperature - 0°C to 50°C
Humidity - 10 to 95% non- condensing
Other Standards - Shock & Vibration. VIBRATION SWEEP SINUSOIDAL as per EN 60068-2-6:2008 VIBRATION RANDOM (EN 60721-3-2 : 1997 – Class 2M2) SHOCK (EN 60068-2-27:2009) or equivalent. Shock 10 G peak to peak. Vibration 1.5 Grms 5-400Hz, on each axis. EMI compliance: As per EN 61326 or equivalent.

And necessary cables/accessories to operate the complete system must be quoted by the vendor.
The vendor should perform all the integration operation between the machines

Training
Detailed training should be provided *onsite in person* on operating the DAQ system and high speed camera in synchronization to a set of students *until they gain the confidence*
The actual recording of the welding current and voltage waveforms in synchronization with the high speed arc imaging will be performed at the time of the training
The trainer should give the detailed training on both the DAQ system as well as the high speed camera
It is mandatory for the vendor to arrange their trainers visit to IIT Tirupati *in person*, two months and four months after the commissioning of the DAQ and high speed camera system. The trainer need to interact with the trainees at IIT Tirupati and clarify their doubts as well as any problems in using the proposed items in the tender
Warranty
Three year warranty for all the above mentioned items (*includes each and every part and accessories of the provided system*) for the smooth and trouble free working after installation and commissioning.
Important Prerequisite
Any hardware, accessories and software (other than the mentioned above) required for the satisfactory installation, commissioning and training of the DAQ system and the high speed camera as well as its hassle free functioning should also be quoted separately.
Pre-installation requirement should be clearly reported in the technical bid documents.

The party should quote for both the items, Splitting of items is not allowed.

3.TENDER FEE & EARNEST MONEY DEPOSIT DETAILS

(a) **Tender Fee of Rs.1500/- (Rupees fifteen hundred only)** should be submitted through ECS (Bank transfer / NEFT / RTGS) in favour of Indian Institute of Technology Tirupati.

(b) **EMD of Rs.2,50,000/- (Rupees two lakh fifty thousands only)** should be submitted ECS (Bank transfer / NEFT / RTGS) in favour of Indian Institute of Technology Tirupati.

(c)   **Bank A/c Details for crediting EMD/Tender Fee**:

   Name   : Indian institute of Technology Tirupati Main Account
   Bank : State Bank of India
   Account No. : 35523338208
   IFSC Code: : SBIN0006677

(d) Micro and Small Enterprises (MSEs) firms as defined in MSE Procurement Policy issued by Department of Micro, Small and Medium Enterprises (MSME) or the firms registered with the Central Purchase Organisation or the concerned Ministry or Department or Start-ups as recognized by Department of Industrial Policy & Promotion (DIPP) for **all these items only**, are exempted from Tender fee/EMD. However, they have to enclose valid self-attested registration certificate(s) along with the tender to this effect.

(e) **The bidders who seeks exemption from Tender fee/EMD as per clause no. (d) above, if they withdraw or modify their bids during the period of validity, or if they are awarded the contract and they fail to sign the contract, or to submit a performance security before the deadline defined in the request for bids document, they will be suspended for the period of three years or as decided by the competent authority from being eligible to submit bids for contracts with the entity that invited the bids.**

(f) EMD of all unsuccessful bidders (if any) will be returned after finalization of the tender. EMD of the successful bidder will be returned only after receipt of Security Deposit towards Performance Guarantee

    (g) In case of successful tenderer, the EMD (if any) may be adjusted towards the Performance Security deposit on request.

(h) The amount of EMD (if any) is liable to be forfeited, if the tenderer withdraws from the offer after submission of the tender or after the acceptance of the offer and fails to remit the Performance Security Deposit.

(i) No interest will be paid on the EMD (if any) / Performance Security deposited / remitted.

(j) The Bidders will have to upload scanned copy of Payment details towards EMD/Tender fee and the same will be accepted only on verification and confirmation by the Institute. Any delay in credit will not be entertained by the Institute. **(As per the format attached in Annexure – I)**

4.   Eligibility Criteria:

4.1. Statutory Documents:

a)   The Bidder should give self-declaration certificate for acceptance of all terms & conditions of tender documents. A duly completed certificate to this effect is to be submitted as per the Annexure-I.

b)   The firm should be neither blacklisted / debarred by any Central / State Government / Public Undertaking / Institute nor is any criminal case registered / pending against the firm or its owner / partners anywhere. A duly completed certificate to this effect is to be submitted as per Annexure-II.

c)   The Bidder must be an Original Equipment Manufacturer (OEM) or his Authorized Dealer/Authorized Distributor/ Channel Partner having a Direct Purchase and Support agreement with the OEM. In case, if the Bidder is a Dealer/ Distributor, a valid LETTER OF AUTHORIZATION for this tender from Original Equipment Manufacturer should be produced along the bid.

d)   The quoted system and accessories must have been supplied and installed similar system/ equipment preferably in any of the *IIT's/ IISC/ NIT's and PSU's* in the past three years. Proof of supply and its working condition in the supplied institutes is a mandatory and must be produced along with the bid document.

e)   Vendor shall possess ISO 9000 certification for quality system implementation. Required evidence shall be provided along with offer.

f)   The vendor should have a office (in India) to cater sales and service support. Documentary proof to be attached. Also the vendor should install and provide training on the quoted machine free of cost as detailed in the specifications.

g)   The vendor should attach income tax returns for the last 3 years i.e from 2016-2018.

4.3 Technical Criteria:

Bidders should comply the minimum specification of the tendered item in all respect. The detailed format is attached at Annexure-VI. The bidder is to complete the same in all respect and submit accordingly

5. FINANCIAL BID DETAILS

Financial bid i.e. BOQ given with tender (in Excel format) to be downloaded first and uploaded after filling all relevant information strictly as per the format failing which the offer is liable for rejection. Kindly quote your offer on FOR IIT Tirupati (inclusive of all taxes and charges) for Indian bidders , CIF Chennai airport for foreign bidders. **Vendor should quote prices in BOQ only, offers indicating rates anywhere else shall be liable for rejection.**

Supplier should quote for the equipment including all accessories/ consumables/ services as per specification on a single responsibility basis. The supplier should be single party responsible for the entire scope mentioned.

The supplier should quote commercially proven model of equipment and/or control system. Prototypes are not acceptable.

6. TIME SCHEDULE:

S. No.	Particulars	Date	Time
a.	Date of Online Publication of Tender	20.12.2019	18.00 hours
b.	Bid Submission Start Date	20.12.2019	18.00 hours
c.	Bid Submission Close Date	08.01.2020	15.00 hours
d.	Closing Date & Time for Submission of EMD & Tender Fee	08.01.2020	15.00 hours
e.	Opening of Technical Bids	09.01.2020	15.00 hours

7. AVAILABILITY OF TENDER

The tender document can be downloaded from http://eprocure.gov.in/eprocure/app and be submitted only through the same website.

8. BID VALIDITY PERIOD

The bid will remain valid for 120 days from the date of opening as prescribed by IIT Tirupati. A bid valid for a shorter period shall be rejected, being non-responsive.

9. BID SUBMISSION

9.1 Instruction to Bidder

Bidders are required to enrol on the e-Procurement module of the **Central Public Procurement Portal (URL: https://eprocure.gov.in/eprocure/app)** by clicking on the link "**Online Bidder Enrolment"** on the CPP Portal. **The registration is completely free of charge**.

Possession of a valid Class II/III DSC in the form of smart card / e-token is a prerequisite for registration and participating in the bid submission activities. DSCs can be obtained from the authorised certifying agencies recognized by CCA India (e.g. Sify/TCS/nCode/eMudhra etc).

Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the CPP Portal.

Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSCs to others which may lead to misuse.

The Bidders are required to log in to the site through the secured log-in by entering their respective user ID / password and the password of the DSC.

The CPP portal also has user manuals with detailed guidelines on enrolment and participation in the online bidding process. The user manuals can be downloaded for reference.

TENDER CLARIFICATION

a) In case the bidders require any clarification regarding the tender documents, they are requested to contact our office Ph no: 0877-2503572 ,Email ID: purchase@iittp.ac.in on or before due date.

b) Technical and Specifications related Clarifications regarding   0877-2503407, Email ID: dvkiran@iittp.ac.in on or before due date.

c) Any queries relating to the process of online bid submission or queries relating to CPP Portal in general may be directed to the 24x7 CPP Portal Helpdesk.

9.2 Online Bid Submission Procedure

Cover-1: The file should be saved in PDF format numbered sequentially and should comprise of the following items:

__Packet-1__: Duly Completed Scanned PDF copy of, PAN, GST, Firm Registration certificate and Annexure-I to VII with relevant supporting documents.

Only the relevant documents as per the tender clauses are to be uploaded along with duly completed checklist as per the annexure-VIII. Uploading of irrelevant documents may liable for rejection of the bid.

Cover-2:

A standard BOQ format has been provided in excel format. Bidders are required to download the BOQ excel file and fill their financial offer on the same BOQ format. After filling the same, submit it online in excel format, without changing the financial template format.

In case of bidders quoting in foreign currency can quote in USD, EURO, GBP, YEN only by selecting the quoting currency in the BOQ format provided.

Note:

   If the bid is incomplete and / or non-responsive it will be rejected during technical evaluation. The bidder may not be approached for clarifications during the technical evaluation. So, the bidders are requested to ensure that they provide all necessary details in the submitted bids.

10. BID OPENING

a)   Technical Bids will be opened on **09.01.2020 @ 15.00 Hrs.**

b)   Financial Bids of the eligible bidders will be opened on a later date. The date and time for opening of Financial Bids will be announced later.

c)   **Bids should be summarily rejected, if tender is submitted other than through online or original EMD & tender fee are not submitted within stipulated date / time.**

11. BID EVALUATION

Stage I : Technical evaluation
Stage-II: Technical evaluation - demonstration
Demonstration : *The vendors who are technically qualified in stage-I should demonstrate the equipment as per the specifications at IIT Tirupati site strictly in the assigned time slot free of charge. The vendors should plan their visit to IIT Tirupati for two days to give the demonstration.*

It is to be noted that IIT Tirupati provide two high speed cameras during the demonstration and the DAQ system demonstration is of the utmost importance in which the vendor should demonstrate the recording of welding current and voltage waveforms forms in a two wire tandem welding power sources in synchronization with the arc images from the two high speed cameras.

The technical bid document and the performance of the equipment during the demonstration are evaluated

which act as the decision parameter for the financial bid opening. Please note that the vendors who don't agree or not available to give the demonstration in the specified time slot will be disqualified even though they are technically complied.

Stage-III : Financial evaluation: The Commercial Bid with the lowest price will be the highest evaluated bid. The foreign quotes will be evaluated based on the exchange rate of the date of opening of the price bid.

The vendor has to explicitly mention to whose favour the order is to be placed, if selected.

12. PAYMENT TERMS

For Indian Bidders :

No advance payment will be made in any case. Bills in Duplicate should be sent and the payment shall be released generally within 30 days, only after it is ensured that the items / quality of the items supplied are to the entire satisfaction of IIT Tirupati and completed the entire work within the stipulated delivery schedule. If any item is found defective, or not of the desired quality etc., the same should be replaced by the firm(s) immediately for which no extra payment shall be made.

For Foreign bidders :

For imported items payment will be made through irrevocable Letter of Credit (LC). 100% of LC will be opened on **CIF Chennai airport value**, out of which 90% will be released against the proof of despatch documents and balance 10% will be released after the successful installation, commissioning and demonstration,training of the equipment at IIT Tirupati site.

Bank charges on LC within India to applicant account and outside India to beneficiary account.
The charges for any LC amendments requested by the vendor will have to be paid by the vendor.

The certificate of country of origin to be submitted.

13. WARRANTY OF QUALITY AND QUANTITY

a) The awardee shall give minimum three years onsite warranty on successful completion of supply, installation, training and commissioning of supplied items.

b) The awardee shall give warranty that all items are as per specification(s), conforming to the specified design and there are no defects in the process of manufacturing, packaging, transportation and delivery.

c) Upon receipt of notice from IIT Tirupati for defective material, the firm shall **within 15 days** of receipt of the notice, replace the defective material, free of cost at the destination. The firm shall take over the defective material at the time of their replacement. No claim whatsoever shall lie on IIT Tirupati for the replaced goods thereafter. If the firm fails to replace the defective goods within a reasonable period, IIT Tirupati may proceed to take such remedial actions as may be necessary, at the company's risk and expense.

14. LIQUIDATED DAMAGES

In case of delay in Supply and installation /replacement by the stipulated date, IIT Tirupati reserves the right of imposing penalty @0.5% per week on the value of the undelivered items subject to maximum 10% of the cost of undelivered items.

15. PERFORMANCE SECURITY DETAILS

a) The successful tenderer will have to deposit the performance security valid for **39 Months** in the form of DD / TDR / FDR / Bank Guarantee @ 10% of the total value of order within 30 days from the date of issue of the award letter. No interest will be paid by IIT Tirupati on the deposit.

b) Performance Security will be refunded to the supplier, after it duly performs and completes the contract/warranty period in all respects.

c) Performance Security will be forfeited if the firm fails to perform/abide by any of the terms or conditions of the contract.

d) In case, the firm fails to execute the order successfully, within specified delivery period, the same goods/items will be procured from open market and the difference of cost, if any, will be recovered from Performance Security or from pending bill(s) of the defaulting firm or from both in case the recoverable amount exceeds the amount of Performance Security.

e) In case of non-receipt of Security Deposit within the stipulated time, EMD will be converted into Security Deposit and the balance amount will be recovered from the bill submitted for the payment.

16.   DELIVERY SCHEDULE

For Indian bidders :
The successful bidder should execute the order successfully i.e. Supply, Installation of ordered item within **2 months** at IIT Tirupati from the date of issue of the purchase order or date of acceptance of sample piece whichever is later. In case of any damage found, the item(s) should be replaced **within 15 days** at IIT Tirupati. The bidder has to make own arrangement for unloading and positioning of items at the desired location of IIT Tirupati.
And installation and commissioning should be completed within 20 days from the date of supply of equipment.

For Foreign bidders :
The successful bidder should execute the order successfully i.e. Supply, Installation of ordered item within **2 months** at IIT Tirupati from the date of opening of LC.

17. TERMS AND CONDITIONS

I)   Termination for Insolvency

a) The IIT Tirupati may at any time terminate the Contract by giving a written notice to the awarding firm, without compensation to the firm, if the firm becomes bankrupt or otherwise insolvent as declared by the competent Court, provided that such termination will not prejudice or affect any right of action or remedy, which has accrued or will accrue thereafter to the department.

b) The courts of Tirupati alone will have the jurisdiction to try any matter, dispute or reference between the parties arising out of this purchase. It is specifically agreed that no court outside and other than Tirupati Court shall have jurisdiction in the matter

II)   Force Majeure

a) Should any force majeure circumstances arise, each of the contracting parties be excused for the non-fulfilment or for the delayed fulfilment of any of its contractual obligations, if the affected party within 15 days of its occurrence informs in a written form the other party.

b) Force Majeure shall mean fire, flood, natural disaster or other acts such as war, turmoil, sabotage, explosions, epidemics, quarantine restriction, strikes, and lockouts i.e. beyond the control of either party.

III)   Arbitration

In the event of any dispute or difference arising under this contract, the Director, IIT Tirupati or his nominee is the arbitrator and the decision of the arbitration will be binding on both parties.

IV)   Patent rights : The supplier shall indemnify the purchase against all third party claims of infringement of patent, trademark or industrial design rights arising from use of the goods or any part thereof in India.

V) **Inspection Clause**: All major mechanical equipment will be inspected by a team of IIT Tirupati after receipt of items at our premises and after clearance in the form of report, the balance 10% payment will be processed.

VI) Other Conditions

a) The bidder has to upload the relevant & readable files only as indicated in the tender documents. In case of any irrelevant or non-readable files, the bid may be rejected.

b) IIT Tirupati reserves the right to accept or reject any or all the tenders in part or in full or may cancel the tender, without assigning any reason thereof.

c) IIT Tirupati reserves the right to relax / amend / withdraw any of the terms and conditions contained in the Tender Document without assigning any reason thereof. Any inquiry after submission of the quotation will not be entertained.

d) IIT Tirupati reserves the right to modify/change/delete/add any further terms and conditions prior to issue of purchase order.

e) Repeat Order: IIT Tirupati reserves the right to place repeat order up to 100% of the quantities within a period of 12 months from the date of successful completion of purchase order at the same rates and terms subject to the condition that there is no downward trend in prices.

f) In case the bidders/successful bidder(s) are found in breach of any condition(s) at any stage of the tender, Earnest Money/Performance Security shall be forfeited.

g) False declaration/documents will be in breach of the Code of Integrity under Rule 175(1) (h) of the General Financial Rules for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the General Financial Rules along with such other actions as may be permissible under law.

h) Conditional tenders will not be considered in any case.

i) In case of doubt in material, the expenditure on testing of equipment will be borne by the tenderer.

j) Institute reserve the right to increase/decrease the order quantity at any period of times during the validity of the contract.

k) **IIT Tirupati may issue amendment/corrigendum to tender documents before due date of submission of bid. Any amendment/corrigendum to the tender document if any, issued by IIT Tirupati will be posted on CPP Portal. For the bidders, submitting bids on downloaded tender document, it is 'bidders' responsibility to check for any amendment/corrigendum on the website of IIT Tirupati or check for the same CPP Portal before submitting their duly completed bids.**

ANNEXURE – I

<center>**Undertaking**</center>

To
The Registrar
Indian Institute of Technology Tirupati
Renigunta Road Settipalli post
Tirupati 517506

Tender No. IITT/MECH/08/2019-20/22
(Notice Inviting Tender for Supply of Data acquisition system and High speed camera with accessories)

Sir,
I /we hereby submit our tender for Supply of Data acquisition system and High speed camera with accessories along with other required documents.

1. I/ We enclosed herewith the following in favour of Indian Institute of Technology Tirupati towards EMD & Tender Fee.

Particular	Amount (Rs)	Payment Reference Details	Payment Date
Tender Fee (Including Tax)	1500/-		
EMD	2,50,000/-		

2. I / We hereby reconfirm and declare that I / We have carefully read, understood & complying the above referred tender document including instructions, terms & conditions, scope of work, schedule of quantities and all the contents stated therein. I / We also confirm that the rates quoted by me / us are inclusive of all taxes, duties etc., applicable as on date.
3. I /we have gone through all terms and conditions of the tender document before submitting the same.

Date:

Seal
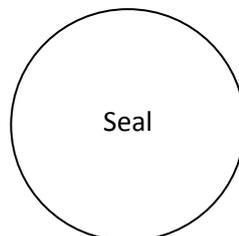
Authorized Signatory

Name:
Place:
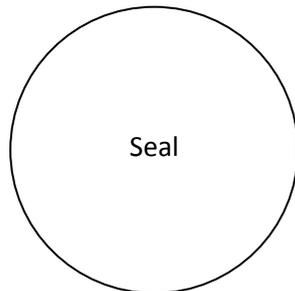
Designation:
Contact No :

ANNEXURE – II

CERTIFICATE
(to be provided on letter head of the firm)

I hereby certify that the above firm neither blacklisted / debarred by any Central/State Government/Public Undertaking/Institute nor is any criminal case registered / pending against the firm or its owner / partners anywhere in India.

I also certify that the above information is true and correct in any every respect and in any case at a later date it is found that any details provided above are incorrect, any contract given to the above firm may be summarily terminated and the firm blacklisted.

Date:

Seal

Authorized Signatory

Name:

Place:
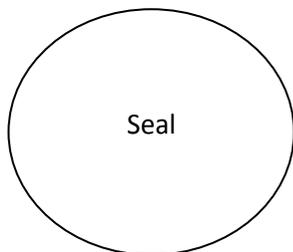
Designation:

Contact No.:

ANNEXURE – III

Work Order Details:

S. No.	Evaluation Criteria	Name and Contact details of the Client	Order No. & Date	Amount	Remark
	List of Purchase Order / Work Order supplied to any NIT/IIT/IISc/PSUs where the similar type of Work executed by you during the past 3 years from the date of publication of tender				
1	**Three similar works of 40% of the estimated value in a financial year OR**	1.			**Supporting document w.r.t. satisfactory execution of work from clients are to be attached along with the Annexure-IV**
		2.			
		3.			
2	**Two similar works of 50% of the estimated value in a financial year OR**	1.			
		2.			
3	**One similar work of 80% of the estimated value in a financial year**	1.			

Date:

Place:

Seal

Authorized Signatory

Name:

Designation:

ContactNo.

Technical Compliance statement

1. Data Acquisition System in Welding Application -01 No

Particulars	Complied (Yes/No)	Remarks if any	Offered Make & Model & Country of origin
Scope: Data acquisition (DAQ) system should synchronize with two high speed cameras and an IR camera to monitor welding arc images, welding current and voltage waveforms. The system should be capable to record welding current and voltage waveforms in *synchronization* with arc image data from two high speed welding cameras and the thermal profiles from the IR camera. The system will be used to study metal transfer/observations of molten droplets, and arc phenomena during welding process.			
Specifications:			
High Voltage Input – 3 in number			
Input type: Differential			
Number of channels per input module: 3 channels per card.			
Voltage input range: +/- 1600V or above			
Protection class: CAT III 600 V or better; CAT II 1000 V or better			
Input protection: In+ to In-: 1.8 kVrms or above			
Input impedance: Better than 10 M ohm			
CMRR: ≥85dB @ DC to 50Hz or better			
DC accuracy (including gain accuracy and offset accuracy) : ≤ ± 0.05%±50mV FSO or better			
Gain stability over temperature: ≤ 50ppm / deg C or better			
Filter type: Low Pass 6 pole or more Bessel/ Butterworth and better			
Filter implementation: Analog / Digital			
Filter (low pass) - 3 dB cut off frequencies: 10Hz to 100kHz. Programmable through software			
Isolation: Between Input, Output, Power supply and between channels. Isolation voltage: 1000V continuous and above.			
Low Voltage input – 4 in number			
Input type: Differential with Isolated Excitation			
Number of channels per input module: 4 channels per card.			
Voltage input range: +/- 100V			
Common Mode Voltage: +/- 500V			
Input protection: >=100V			
Input impedance: Better than 10 M ohm			
CMRR: ≥70dB @ DC to 50Hz@100V range or better			
DC input accuracy: ≤ ± 0.05%+100uV FSO or better			
Gain stability over temperature: ≤ 50ppm / deg C			
Filter type: Low Pass 6 pole or more Bessel/ Butterworth or better			
Filter implementation: Analog / Digital			
Filter (low pass) -3 dB cut off frequencies: 10Hz to 100kHz. Programmable through software			
Isolation: Between input, excitation, power supply and between channels. Isolation voltage: 1000V continuous and above			
Excitation Voltage: 2-30VDC Bipolar			
Excitation Accuracy: ±0.1 % ±5 mV or better			
Excitation Current limit: 200mA or better			

General			
DAQ system should have the capability to operate each channel with individual sampling rates			
ADC: 16 bit /Channel			
Sampling Rate (max): 1 Mega samples per second per channel (Variable 100Hz-1MHz) or above			
Bandwidth: Up to 500kHz			
Operating temperature: 0-50^0 C			
Power supply: 190-230 V AC, 50 Hz			
External DC input: 24V			
Humidity: 10 to 95% non- condensing			
Other Standards: Shock & Vibration - Vibration sweep sinusoidal as per EN 60068-2-6:2008 VIBRATION RANDOM (EN 60721-3-2: 1997 – Class 2M2) SHOCK (EN 60068-2-27:2009) or equivalent Shock 10 G peak to peak. Vibration 1.5 Grms 5-400Hz or better, on each axis.			
Accessories: • Transit case for DAQ system and accessories • Tools required for connecting the accessories in DAQ system			
Additional requirement that must be provided by vendor along with DAQ system			
The vendor must provide the lookup table with the current and voltage data acquired after calibrating the existing LEM current sensors with the customer. Subsequently that information will be fed into the DAQ system.			
The vendor also must provide the lookup table with the current and voltage data acquired after calibrating the current sensors that will be bought by the customer even after the installation and commissioning of the DAQ system. Because this lookup table data will be fed into the supplied DAQ system. It is to be noted that the lookup table should be provided by the vendor within one week after giving the current sensors by the customer.			
The vendor must provide the rigid and compact system which can provide the power supply to three existing LEM current sensors (at present with the customer) and subsequently communicating the data of the measured welding current from the current sensors to the DAQ system.			
Data acquisition software for camera integration:			
Complete software for data acquisition, storage, processing, data print out and analysis shall be supplied along with the items			
System should be able to store measurement settings like measurement type, gain, scaling etc.			
Replay of the stored data file should be possible.			
Review of stored data without interrupting data acquisition and storing process.			
Vendor has to establish the Synchronization b/w the two high speed cameras, one IR camera and DAQ system.			
Should synchronize the high speed welding arc images and the recording welding current and voltage data from two welding power sources in real time (while performing welding experiments). ***Offline synchronization alone is not acceptable.***			
The acquisition software shall be capable of scanning the selected user required channels at user required sampling rate.			

Channel legend, description, filter settings, type of voltage input shall be selectable by the user.			
Acquisition shall start on receipt of a TTL/any level trigger signal or from keyboard function keys (manual triggering). Pre time and post time trigger settings should be available.			
Should be possible to store the welding arc images (in TIFF and JPEG formats) from the recorded data at the interested frame without changing the resolution. In other words, it should be possible to store a welding arc image at a selected welding current and voltage points in the recorded data without changing the resolution at which the welding arc images are recorded.			
Should be possible to convert the acquired data as a video file.			
The software shall be capable of accepting input channel wise legends, description, units and calibration data constants for Engineering Unit (EU) conversion.			
Reduced sample points exporting should be possible for further analysis in third party software like text, csv, xlsx, matlab etc.			
Real time or Online processing of the recording data from selected channels with user defined mathematical functions, as well as the inbuilt functions for averaging, Filtering etc. simultaneously while performing the welding experiments			
Off-line processing of selected channels with user defined mathematical functions, as well as the inbuilt functions for averaging, Filtering etc. after performing the welding experiments			
The provision for giving the user defined mathematical functions, and statistical analysis tools (RMS plot, Time Domain plot, waterfall plot, Average, Min, Max, Correlation, Strain Rosette etc.) shall be available for processing and analysing the recording data online (in real time) while performing the welding experiments as well as offline.			
Visualization: Software should include following visual controls: • Camera, Time recorder graph, Digital Value, Bar graph, XY plots, Scope window,FFT,2D graph, 3D graph, Overload indicator etc. • It should be possible to visualize the arc images, welding current and voltage waveforms simultaneously in a single front window/screen. The window/screen should also display the welding arc frame number and the corresponding RMS welding current and voltage.			
The software must support synchronizing multiple Cameras (two high speed cameras and one IR camera) with the DAQ system. The recorded high speed camera images and IR camera images must be synchronized with the recorded welding current and voltage waveforms.			
The vendor should also take the responsibility of synchronizing the additional high speed camera and the infrared radiation camera procured after the installation and commissioning of the supplied DAQ system. For these additional cameras, the vendor should provide the necessary add-on/plugins, modification to the software and the necessary accessories free of charge, and should give the complete system in working condition.			
If license required for software, it should be supplied free of cost, preferably perpetual license that can be installed in any PC (multiple PC's) and post processing without license.			
DAQ software should have filtering options (FIR, IIR, integration, derivation) at the time of acquisition and analysis.			
DAQ software should have Logical conditions (AND,OR,NOT)			
Statistics (RMS, AVG; Min, MAX, Std deviation, variance) inbuilt with the software.			

	Complied (Yes/No)	Remarks if any	Offered Make & Model
Software should also give the provision to feed the user defined statistical models.			
Spectral Analysis (FFT, STFT, CPB) should be possible			
The system should be modular, expandable and compact.			
Custom data export rate should be user defined for each channels.			
Pre-installation requirement should be clearly reported in the technical bid document			
Warranty : 3 years onsite warranty (includes each and every part and accessories of the provided system)			
Technical brochures to be attached			

02. High speed camera and related accessories -01 No

	Complied (Yes/No)	Remarks if any	Offered Make & Model
Scope: The camera offered should have full hardware capable of synchronizing the high speed images of the welding arc with the welding current and voltage waveforms recording using the data acquisition system while performing the experiments. In other words online synchronization of the high speed images of the welding arc with the welding current and voltage waveforms. The required Plugins/software should be pre-loaded and integrate along with the DAQ system.			
Specifications:			
Resolution: 1-Megapixel or better			
Sensor: CMOS Monochrome image sensor			
Pixel size: 20μm x 20μm or better			
Frame rate: ≥6400 fps or more at 1024 x 1024 pixels ≥700,000 fps or more at lower resolutions			
Record duration: ≥ 3.5 second at 20,000 fps in full resolution			
Shutter and minimum exposure time: Global electronic shutter to ≤ 0.2 μs or better selectable independent of frame rate			
Dynamic Range: 12-bit monochrome			
Memory capacity: 32 GB			
Region of interest: Selectable in steps of ~ 128 x 16 pixels			
Trigger inputs: Selectable +/- TTL 5V and switch control			
Input: Trigger TTL/Switch, Sync, ready, event			
Output: Trigger, sync, ready, rec, exposure			
Trigger Modes: Start, end, center, manual mandatory. Mention other record options if available.			
External sync: +/- TTL 5Vp-p variable frequency sync			
Partitions: ≥ 63 segments to allow multiple recordings			
ISO 12232 Ssat sensitivity: At least ISO 64,000 Monochrome			
Trigger Options: Trigger from camera control software and external trigger using BNCs			
Camera Control: High Speed Gigabit Ethernet			
The camera recording should be in synchronization with the welding current and voltage data.			
All necessary hardware/ software for DAQ compatibility should be quoted.			
F-mount adapter (G-type lens compatible)			
Lens: 300 mm f/4.5 zoom lens – F Mount/G-type lens and compatible with camera (should specify the model and make)			

Tripod with 3 way head: Heavy duty tripod – upto 10 kg (should specify the model and make with complete details) Medium duty tripod – upto 5 kg (should specify the model and make with complete details)			
Accessories: • 25-300mm f/4.5 lens compatible ND filters set • Padded bag for tripods • Transit case for high speed camera and accessories			
Control Software: • The camera control software should be user friendly. • The camera control software should display the record parameters like frame rate, resolution, record duration, trigger mode, shutter speed etc before recording. • The camera control software should be capable to let the user review/ crop recorded video before saving. • The camera control software should have basic image processing tools like brightness, contrast, gamma. • The camera control software should have basic analysis tool to measure distances between two points and angles. • The camera control software should assist the user in focusing of image. • The camera control software should have options to correct lens distortion and camera orientation effects for better analysis accuracy • The camera control software should permit playback of multiple sequences synchronized by frame number or time to permit comparison of data acquired at different speeds			
Data Download: The camera should have facility to auto download after the recording. The camera should have option of recording while download is in progress.			
Operating temperature: At least up to 40 degree Celsius			
Weight: ≤ 3.5 kg			
Power Requirements: 100 to 240V, 50 to 60Hz AC			
The vendor should specify the make and the model of the high speed camera with complete details			
General:			
Power supply - 190-230 V AC, 50 Hz			
External DC input - 24V Dc			
Operating-temperature - 0°C to 50°C			
Humidity - 10 to 95% non- condensing			
Other Standards - Shock & Vibration. VIBRATION SWEEP SINUSOIDAL as per EN 60068-2-6:2008 VIBRATION RANDOM (EN 60721-3-2 : 1997 – Class 2M2) SHOCK (EN 60068-2-27:2009) or equivalent. Shock 10 G peak to peak. Vibration 1.5 Grms 5-400Hz, on each axis. EMI compliance: As per EN 61326 or equivalent.			
And necessary cables/accessories to operate the complete system must be quoted by the vendor.			
The vendor should perform all the integration operation between the DAQ system and cameras.			
Pre-installation requirement should be clearly reported in the technical bid document			
Warranty : 3 years onsite warranty (includes each and every part and accessories of the provided system)			

Technical brochures to be attached			

ANNEXURE –V

COMPANY DETAILS

Name of the Party		
Date of Incorporation / Establishment		
PAN Number		
GST Registration Number		
Bank Details	**Account Number**	
	IFS Code	
	Bank Name	
	Branch Name	
Office Address for Postal Communication		
Authorized Signatory Details **(Company/Firm Authorization by the competent authority, to be attached)**	**Name**	
	Designation	
	Email	
	Phone	
Details of Contact other than Authorized Signatory	**Name**	
	Designation	
	Email	
	Phone	

Signature and Seal of the Tenderer:
Name in Block Letter:
Designation:
Contact no.
Date:

CHECKLIST FOR BIDDERS TO BE SUBMITTED IN DULY FILLED AND SIGNED CONDITION

S No	Name of the documents	Submitted Yes/No	Page no. of the attached document
1	PAN Card		
2	Incorporation/Registration certificate of company		
3	GST Registration copy		
4	Tender fee details/MSME/NSIC Certificates		
5	EMD details/MSME/NSIC Certificates		
6	Tender acceptance letter (Annexure I)		
7	Blacklisting undertaking (Annexure II)		
8	List of required purchase orders/Work orders for the last 5 years with Annexure III as per tender clause no. 4.1.c		
9	Annual turnover details (Annexure IV)		
10	Technical compliance statement duly filled and signed (Annexure VI)		
11	Company details duly filled and signed (Annexure VII)		
12	Authorisation letter duly signed regarding OEM/Authorised dealer/Authorised distributor of a firm		
13	Last 3 years income tax returns		

Note: **Submission of tender without the above mentioned documents will leads rejection/disqualification of the tender.**

Signature of the bidder with stamp