

**Indian Institute of Science (IISc), Bengaluru  
560012**

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**NOTICE INVITING TENDER**

**under the two-cover bid format**

*for*

**Supply and Installation of**

**CLOSED LOOP WAVEFRONT RECONSTRUCTION ALGORITHM  
DEVELOPMENT TEST BED**

*at*

**Department of Aerospace Engineering,  
Indian Institute of Science  
Bengaluru 560012**

***Tender No: AE/ENQ/TNDR/RP/2627/01***

***Date: 27/07/2026***

**Email: [padhi@iisc.ac.in](mailto:padhi@iisc.ac.in)**

This is a Request for Quote (RFQ) for domestic (India-based) bidders for the supply and installation of **CLOSED LOOP WAVEFRONT RECONSTRUCTION ALGORITHM DEVELOPMENT TEST BED** at Department of Aerospace Engineering, IISc-Bengaluru.

## Section 1 - Bid Schedule

|   |                                           |                                                                                                                                                                                                                        |
|---|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Tender No                                 | <b>AE/ENQ/TNDR/RP/2627/01</b>                                                                                                                                                                                          |
| 2 | Tender Date                               | <b>27/07/2026</b>                                                                                                                                                                                                      |
| 3 | Item Description                          | Supply and Installation of <u>CLOSED LOOP WAVEFRONT RECONSTRUCTION ALGORITHM DEVELOPMENT TEST BED</u> at Department of Aerospace Engineering, IISc Bengaluru                                                           |
| 4 | Tender Type                               | Two bid system<br>(i) Technical Bid (Part A)<br>(ii) Commercial Bid (Part B)                                                                                                                                           |
| 5 | Place of tender submission                | The Chairman Office,<br>Department of Aerospace Engineering,<br>Indian Institute of Science, Bangalore 560012                                                                                                          |
| 6 | Last Date & Time for submission of tender | <b>28/08/2026</b><br><b>05:00 pm</b>                                                                                                                                                                                   |
| 7 | For further clarification                 | Prof. Radhakant Padhi<br>Department of Aerospace Engineering,<br>Indian Institute of Science, Bangalore – 560012<br>Email: padhi@iisc.ac.in with a copy to roymahapatra@iisc.ac.in<br>Phone: +91-80-2293 2756 (office) |

## Section 2 – Eligibility Criteria

### Prequalification criteria:

1. The Bidder's firm should have existed for at least five years. Bidders should enclose the Company Registration Certificate.
2. **Past Performance:** The Bidder must provide evidence of having supplied and successfully installed adaptive optics systems, precision photonics setups, or advanced laser-optics experimental systems within the past 5 years in India. Evidence may include purchase orders, commissioning reports, client confirmation letters, or declarations from the OEM.
3. The Bidder should have well equipped and qualified technical service personnel for the instrument(s) since last more than 10 years in India. The service personnel should be regularly trained by the Laser and optics source manufacturer/OEM.
4. The quote should come only from an Indian Original Equipment Manufacturer (OEM) or their Indian authorized distributor. In this regard, an appropriate letter should be provided on the company letterhead with the manufacturing facility detailed address, country, contact person mail-ID etc.
5. If the bidder is not the OEM, formal authorization and commitment from the OEM must be provided for system integration, calibration, and performance validation support during installation and acceptance.
6. The Bidder should belong to either Class-1 or Class-2 suppliers distinguished by their "local content" as defined by recent edits to GFR. They should mention clearly which class they belong to in the cover letter.
  - a. Class-1 supplier: Goods and services should have local content equal to or more than 50%.
  - b. Class-2 supplier: Goods and services should have local content equal to or more than 20 % and less than 50%.
7. Bidders offering imported products will fall under the category of non-local suppliers. They cannot claim themselves as Class-1 local suppliers/Class-2 local suppliers by claiming services such as transportation, insurance, installation, commissioning, training, and other sales service support like AMC/CMC, etc., as local value addition.
8. Purchase preference, as defined by the recent edits to GFR (within the "margin of purchase preference"), will be given to the Class-1 supplier.
9. MSMEs can seek exemption from some qualification criteria. IISc follows GFR2017 for such details.

10. The quotations should be on FOR-IISc Bengaluru basis in INR only.
11. All documentation in the tender should be in English.
12. The bidder should sign and submit the declaration for Acceptance of Terms and Conditions as per -Annexure 4.
13. The Bidder must not be blacklisted/banned/suspended or have a record of any service-related dispute with any organization in India or elsewhere. A declaration to this effect must be given as per Annexure 3.
14. Any information furnished by the bidder found to be incorrect, immediately or later, would render the bidder liable to be debarred from tendering/taking up work in IISc, Bengaluru.

### **Cancellation of Tender:**

1. Bids with inconsistencies with respect to this Section 3 Terms and Conditions and Section 4 Technical Specifications will be rejected.
2. Notwithstanding anything specified in this tender document, the IISc purchase committee, in its sole discretion, unconditionally and without having to assign any reason, reserves the rights:
  - a. To accept OR reject the lowest tender, any other tender, or all the tenders.
  - b. To accept any tender in whole or in part.
  - c. To reject the tender, offer not confirming the tender terms.

## Section 3 – Terms and Conditions

### Documents Required for Submission of Tender:

1. Tenders should be submitted in two envelopes (a two-bid system).
  - a) **Technical Bid (Part-A)** – A technical bid must be prepared consisting of Annexure 1-5. Additionally, in Annexure 5A, additional remarks from the OEM may be provided to highlight technical features justifying qualification in terms of specifications, and provide any additional details, compare the solution with competitors.

The bidder must submit a detailed optical layout, or ray diagram of the proposed AO system, including subsystem placement, beam propagation, and key components (laser, WFS, DM, FSM, detectors, and control system) with their closed-loop interaction to be submitted under Annexure 5B. non-submission of the optical layout may lead to rejection of the technical bid. The requirements are mentioned in Section 4 Technical Specifications.
  - b) **Commercial Bid (Part-B)** – Indicating item-wise price for the items mentioned in the technical bid, as per the format of quotation provided in the tender and other commercial terms and conditions.
2. The technical bid and the commercial bid should be placed in separate envelopes and sealed, superscribing the tender description, tender no., and the due date on both envelopes. Both these sealed envelopes are to be placed in a single bigger envelope, which should also be sealed and duly super-scripted with the Tender No, Description & Due Date.
3. The single bigger sealed envelope should reach The Office of Chairman, Department of Aerospace Engineering, Indian Institute of Science, Bengaluru – 560012, India, on or before the due date mentioned in the tender notice. If the due date is a holiday, the tender will be accepted on the next working day. If any of the envelopes are not sealed, the bid will be rejected.
4. All queries are to be addressed to the contact details as mentioned in Section 1 – Bid schedule, item no. 7 of this tender notice.
5. GST/other taxes, levies, etc., should be indicated separately. The Bidder should mention GST Registration no. and PAN in the tender document.
6. If the price is not quoted in the Commercial Bid as per the format provided in the tender document, the bid may be rejected.
7. The purchase committee reserves the right to accept or reject any bid, and annul the bidding process, and reject all bids at any time prior to the award of the contract without thereby incurring any liability to the affected bidder or bidders, or any obligation to inform the affected

bidder or bidders about the same.

8. Leaflets and Descriptive Literature: Full descriptive particulars and drawings of the equipment offered should accompany the tender. Information regarding the country of manufacture or origin of materials used in the manufacture of the articles should be furnished.
9. Incomplete bids will be summarily rejected.

### **Validity of the Offer:**

The offer shall be valid for **90 days** from the commercial bid's opening date.

### **Evaluation of Offer:**

1. The technical bid (Part A) will be opened first and evaluated.
2. Bidders meeting the required eligibility criteria in Section 2 of this document shall only be considered for Commercial Bid (Part B) opening. Further, agencies not furnishing the documentary evidence as required will not be considered.
3. Prequalification of the bidders shall not imply final acceptance of the Commercial Bid. The bid may be rejected at any point during technical evaluation or commercial evaluation. The decision regarding acceptance and/or rejection of any offer in part or full shall be the sole discretion of IISc Bengaluru, and the decision in this regard shall be binding on the bidders.
4. The contract award will be subject to acceptance of the terms and conditions stated in this tender.
5. Any offer which deviates from the vital conditions (as illustrated below) of the tender is liable to be rejected:
  - a) Non-submission of complete offers.
  - b) Receipt of bids after the due date and time or by email/fax (unless specified otherwise).
  - c) Receipt of bids in open conditions.
6. In case any Bidder is silent on any clauses mentioned in these tender documents, IISc Bengaluru shall construe that the Bidder has accepted the clauses as of the tender, and no further claim will be entertained.
7. All amendments, time extensions, clarifications, etc., within the tender submission period, will be communicated electronically. No extension of the bid due date/time shall be considered due to a delay in receipt of any document(s) by mail.
8. No revision of the terms and conditions quoted in the offer will be entertained after the last date and time fixed for receipt of tenders.
9. The lowest bid will be calculated based on the total price of all items tendered for the basic equipment, accessories selected for installation, operation, pre- and post-processing, optional items, recommended spares, warranty, and annual maintenance contract. The

purchase committee seeks the most cost-effective solution for obtaining a new product. A Bidder is encouraged to propose all avenues, including but not limited to buy back of the existing product, turnkey upgrade of existing product or purchase of new parts for the product.

10. The bidder may furnish any additional information necessary to establish capabilities to complete the envisaged work successfully. It is, however, advised not to provide superfluous information.
11. If required, the Bidder should give a technical presentation by their expert to the tender committee to clarify their queries, if any, during the technical evaluation.
12. With prior intimation and necessary approval, the bidder may visit the installation site before tender submission.

### **Pre-requisites:**

The bidder shall provide the pre-requisite installation requirement of the equipment along with the technical bid.

### **Spares:**

The bidder shall provide a detailed Bill of Materials, user manuals, and a list of all recommended spares, consumables, accessories, and replacement parts associated with the supplied system. The list shall include OEM/manufacture name, part number, quantity, function, and confirmation of availability for a minimum period of three (3) years after installation. The bidder shall separately identify critical spares required for AO components including WFS, DM, FSM, cameras, DAQ hardware, controllers, optics, and associated electronics.

### **Warranty:**

The complete system must be under warranty for a minimum period of 3 years (year-wise breakup value should be shown in the commercial bid). The Bidder should include the cost of any spares needed during the warranty period, including electronics, subcomponents, and software. If the instrument is defective, it must be replaced or rectified at the bidder's cost within 30 days from receipt of written communications from IISc, Bengaluru. If there is any delay in replacement or rectification, the warranty period should be extended.

### **Annual Maintenance Contract (AMC):**

1. An annual maintenance contract for at least three years post-warranty should be provided as an optional item upon completion of the warranty period. Cost break-up for this should be provided year-wise.
2. The AMC costs will not be considered for classifying the bidder's domestic nature (class 1 or class 2) (see eligibility criteria in section 2).

## **Delivery, Installation, Acceptance, Training, and Demonstration:**

1. **Delivery:** The bidder shall provide the lead time to delivery of the system at IISc, Bengaluru, from the date of receipt of the purchase order.
2. **Installation and Acceptance:** The bidder shall provide the lead time from the date of delivery to the completion of installation and testing toward acceptance of the system, within 2 weeks.

**Acceptance Criteria:** The following tests and reports shall be submitted for system acceptance after installation, in line with the technical specifications or better as offered by the bidder. The bidder may carry out integration and validation in coordination with the OEM and in consultation with the IISc technical team; however, overall responsibility for satisfactory system performance shall remain with the bidder.

- I. Verification of proper functioning of all major subsystems, including laser, WFS, DM, FSM, cameras, synchronization hardware, and control software.
- II. Calibration, integration, and alignment of all components into a functional AO testbed with stable operation.
- III. Demonstration of closed-loop AO operation with observable wavefront correction performance consistent with system capability.
- IV. Verification of FSM functionality, including tip-tilt correction response and beam pointing stabilization under closed-loop operation.
- V. Validation of control, timing, triggering, and synchronization across all interconnected subsystems.
- VI. Submission of complete system documentation, optical layout, calibration records, and operational procedures.

**Training and Installation:** After successful installation and inspection, the date of taking over the entire system by the IISc, Bengaluru, shall be taken as the start of the warranty period.

3. No partial shipment is allowed.
4. The bidder should also arrange testing and validation of performance as per specification, technical training, demonstration, and for the facility technologists of user facility with no additional cost.

## **Post-Installation Support and Technical Assistance**

1. The supplier must provide active support for the complete installation, integration, and commissioning of the AO testbed system.
2. The supplier shall provide monthly online technical assistance (minimum 1 hour) on mutually agreed dates to address system performance, debugging, and operational challenges.

3. The supplier shall depute a qualified engineer to IISc Bengaluru at least at least once every six months for on-site inspection, troubleshooting, and system optimization.
4. The scope of support shall include subsystems such as AO loop control, WFS calibration, DM/FSM tuning, synchronization, and data acquisition systems.
5. Separate commercial quotes must be provided for:
  - I. Monthly online technical support
  - II. at least once every six months on-site visits on request
6. The bidder shall specify response time ( $\leq 48$  hours) and resolution time commitments, with critical issues to be resolved within a mutually agreed maximum timeframe.

### **Payment Terms:**

90% payment will be released after delivery, inspection, and satisfactory installation of the system. The remaining 10% will be released after successful completion of acceptance tests. Alternatively, payment through an Indian Letter of Credit (LC) may be considered as per mutually agreed terms, subject to TDS as per rules.

AMC costs (if ordered after completion of the warranty period) will be released on a half-yearly basis at the end of each six months, subject to satisfactory services. The price must be on FOR-IISc Bengaluru basis only. As per GFR, no advance payment can be made to domestic bidders unless an equal amount of bank guarantee is provided.

### **Statutory Variation:**

Any statutory increase in the taxes and duties subsequent to the bidder's offer, if it takes place within the original contractual delivery date, will be borne by IISc, Bengaluru, subject to the claim supported by documentary evidence. However, if any decrease occurs, the advantage will have to be passed on to IISc, Bengaluru.

### **Disputes and Jurisdiction:**

Any legal disputes arising from any breach of contract pertaining to this tender shall be settled in the court of competent jurisdiction in Bengaluru, India.

### **Purchase Order:**

1. The order will be placed with the bidder whose bid is accepted by IISc based on the terms & conditions mentioned in the tender document.
2. The quantity of the items in the tender is only indicative. IISc, Bengaluru reserves the right to increase /decrease the quantity of the items depending on the requirement.
3. If the product and service quality is unsatisfactory, IISc, Bengaluru reserves the right to cancel or amend the contract.

## Technical Specifications

**For Optical Layout (Annexure 5B):** The proposed AO testbed employs a 1064 nm laser source with a 532 nm alignment laser, beam conditioning optics, and relay imaging stages to form a closed-loop wavefront correction system. The optical path incorporates a Fast-Steering Mirror (FSM) for tip-tilt correction, a Deformable Mirror (DM) for higher-order correction, and a Shack-Hartmann Wavefront Sensor (WFS) for wavefront measurement. Beam splitters and dichroic separate VIS and NIR channels for diagnostics using SWIR cameras and other sensors. A tabletop turbulence generator can be introduced in the beam path for controlled disturbance generation. The complete system operates under synchronized timing and data acquisition for closed-loop AO experimentation.

The following technical specifications must be demonstrated during system installation and acceptance.

| ITEM NAME                         | ITEM DESCRIPTION                                                                                                                     | QTY |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Adaptive Optics Components</b> |                                                                                                                                      |     |
| <b>Lens</b>                       | Ø1" PCX lens, f=100 mm                                                                                                               | 7   |
|                                   | Ø1" PCX lens, f=~75 mm                                                                                                               | 3   |
|                                   | N-SF11 PCV lens, f=-30 mm, Ø1"                                                                                                       | 1   |
|                                   | Large convex lens ≥6" dia (or 3" lens for up to 5× expansion) or compound Beam Expander                                              | 2   |
|                                   |                                                                                                                                      |     |
| <b>Variable ND filter</b>         | Upto OD 3 or suitable                                                                                                                | 1   |
| <b>Mirrors</b>                    | Ø1" dielectric mirror, 400–750 nm, R>99%, CA≥22 mm                                                                                   | 5   |
|                                   | Ø1" broadband mirror, 750–1100 nm                                                                                                    | 5   |
|                                   |                                                                                                                                      |     |
| <b>Dichroic</b>                   | Ø1" long-pass dichroic, reflect 532 nm, Transmits 1064 nm                                                                            | 2   |
|                                   |                                                                                                                                      |     |
| <b>Position-Sensing Detectors</b> | 2D lateral effect position sensor, 320-1100 nm spectral range, 9×9 mm active area, ≥15 kHz bandwidth, ±4 V output, ±5 VDC operation. | 1   |
|                                   |                                                                                                                                      |     |
| <b>Beam Splitters</b>             | 1" NPBS cube 50:50                                                                                                                   | 1   |
|                                   | Custom BS1/optics: To split 1064 nm laser and green laser must not be in reflected                                                   | 1   |
|                                   | Custom BS2/optics: To split green laser light and 1064 nm laser must not be in reflected path                                        | 1   |

|                              |                                                                                                                                                                                     |   |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|                              |                                                                                                                                                                                     |   |
| <b>AO Active Components</b>  | Fast Steering Mirror, two-axis beam steering, Ø75 mm clear aperture, ±6° angular range, ≥97% reflectance (450 nm–2 µm), 3 ms response time.                                         | 2 |
|                              | 40-actuator piezo Deformable Mirror, Ø14 mm pupil, 450 nm–20 µm protected silver coating, 4 kHz update rate, 0.5 ms response along with DM driver                                   | 2 |
|                              | Shack–Hartmann WFS, aperture ~11 mm, lenslet pitch 100–150 µm, ≥100 fps, WFS calibration accessories (alignment plate, reference flat, calibration software) and SDK                | 2 |
|                              |                                                                                                                                                                                     |   |
| <b>Laser And Accessories</b> | Alignment diode laser, <5mW, green, collimated, <3 mm                                                                                                                               | 1 |
|                              | Laser mounting kit                                                                                                                                                                  | 1 |
|                              | VIS zoom beam expander 4×–16×, 400–650 nm                                                                                                                                           | 1 |
|                              | Kinematic clamping mount for VIS expander                                                                                                                                           | 1 |
|                              | 1064 nm single-frequency laser, <50 pm stability, <200 kHz linewidth, power ~100 mW–1 W                                                                                             | 1 |
|                              | Laser accessory bundle (PSU, controller, interlock)                                                                                                                                 | 1 |
|                              | NIR zoom beam expander 4×–16×, 1050–1650 nm                                                                                                                                         | 1 |
|                              | Kinematic mount for NIR expander                                                                                                                                                    | 1 |
|                              |                                                                                                                                                                                     |   |
| <b>Power Measurement</b>     | Power meter 300–1100 nm, 100 µW–2 W, ±3%, thermopile head for 1070 nm                                                                                                               | 2 |
|                              |                                                                                                                                                                                     |   |
| <b>Cameras</b>               | SWIR camera, InGaAs sensor, wavelength 400–1700 nm, ≥100 fps, ≥640×512, 12–15 µm pixel, C-mount; SWIR lens 25–50 mm (AO-25) and 50–75 mm (AO-60); extension rings, trigger I/O, SDK | 2 |
|                              | IR bandpass/ND filters (900–1300 nm as needed)                                                                                                                                      |   |
|                              |                                                                                                                                                                                     |   |
| <b>Screen And Alignment</b>  | VIS-blocking / NIR-sensitive sheet, peak 900–1300 nm, peel-and-stick, ≤0.5 mm                                                                                                       | 1 |
|                              | Reflective screen 300–1100 nm, Lambertian, ρ ≥95%                                                                                                                                   | 1 |
|                              | VIS/NIR detector card 400–640 nm & 800–1700 nm, ≥50×50 mm                                                                                                                           | 2 |
|                              | SM1-threaded visible & IR alignment disk (400–640 nm, 800–1700 nm)                                                                                                                  | 2 |
|                              | Beam Profiler, camera-based, wavelength range 350–1100 nm, includes ND filters (OD 0.5–4) and 1–5% beam samplers, supports pulsed and CW lasers, sensor res≥1920×1080               | 1 |
|                              |                                                                                                                                                                                     |   |

|                                         |                                                                                                                                           |               |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Mounts / Posts / Holders / Cages        | Mirror mounts for VIS mirrors and for NIR mirrors                                                                                         | 3 sets each   |
|                                         | Mounts for dichroic                                                                                                                       | 1             |
|                                         | Magnetic quick-release carriages, 30 mm & 60 mm cage systems, M4                                                                          | 8             |
|                                         | Magnetic quick-release carriage set (Beam Reducer)                                                                                        | 4             |
|                                         | Stainless-steel posts & anti-slip post holders for listed optics (mirrors/dichroic/BS/DM/WFS/cameras/lenses) — As listed (multiple lines) | 1 lot         |
|                                         | Kinematic DM mounts + strain-relieved HV cabling & shielded feedthroughs                                                                  | Qty as needed |
|                                         |                                                                                                                                           |               |
| Rails / Positioning                     | Dovetail optical rail 600 mm, metric; straightness ≤50 μm/600 mm; M6 slots                                                                | 6             |
|                                         | Dovetail optical rail 300 mm, metric; straightness ≤50 μm/600 mm; M6 slots                                                                | 6             |
|                                         | Dovetail rail carriers 50.8×25.4 mm, M6 CB, M4 taps; load ≥10 kg; backlash ≤10 μm 4                                                       | 24            |
|                                         | Indexing mounting base, 16-position, 8-32 taps                                                                                            | 4             |
|                                         |                                                                                                                                           |               |
| Optical Table                           | Optical breadboard <b>1500×2400×200 mm</b> , steel honeycomb; skin ≥2 mm; damping core; static deflection ≤0.5 mm under <100 kg           | 1             |
|                                         | Pneumatic vibration isolation 3–5 Hz, payload capability ≥800 kg; levelling valves                                                        | 1             |
|                                         | Air compressor for isolators                                                                                                              | 1             |
|                                         | Overhead shelves for 5×8 ft table; load ≥80 kg                                                                                            | 1             |
|                                         |                                                                                                                                           |               |
| Optics Cleaning Kit                     | Lens tissues, PU-free swabs, blower, PA/acetone/reagent-water solvents, anti-static brush, nitrile gloves, MSDS included.                 |               |
|                                         |                                                                                                                                           |               |
| Hot Air Turbulence Generator (Tabletop) | Self-contained module ≈400×200×200 mm; EC fans (PWM 0–100%), heater pads ≈500 W (PID), optional RH 30–90%                                 | 1 set         |
|                                         | Windows FS/BK7, AR; CA ≥70 mm; 0.5–1.0 m channel; adjustable baffles; DAQ 8 AI, 4 AO, 1 kHz; elastomer dampers                            |               |
|                                         |                                                                                                                                           |               |
| Filtration unit                         | Filtration unit with Carbon + HEPA H13, ≥99.95% @0.3 μm; 300–500 m³/h; ≤60 dBA                                                            | 2             |
|                                         | Antistatic flexible hoses, 1 m, ID 50–100 mm                                                                                              | 4             |

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |
| <b>Data Interface System</b> | Master Timing & Trigger Hub: 10 MHz + PPS, $\leq 1 \mu\text{s}$ jitter, 2 isolated banks (AO-25 / AO-60), programmable triggers; clock I/O                                                                                                                                                                                                                                                                                                                                                          | 2 set |
|                              | Real-Time I/O Interface (standard): $\sim 16$ DI / 16 DO, 8 AI ( $\pm 10 \text{ V}$ , $\geq 100 \text{ kS/s}$ ), 8 AO ( $\pm 10 \text{ V}$ ); sync to 10 MHz + PPS                                                                                                                                                                                                                                                                                                                                  |       |
|                              | Real-Time I/O (FPGA upgrade): onboard FPGA, deterministic low-latency ( $\sim 50\text{--}100 \mu\text{s}$ ); same I/O class & sync option                                                                                                                                                                                                                                                                                                                                                           |       |
|                              | Camera sync harness: equal-length coax; WFS & SWIR trigger-in and strobe/frame-valid return                                                                                                                                                                                                                                                                                                                                                                                                         |       |
|                              | DM/FSM timing harness: shielded Update-Tick & Command-Tick with ready/lock returns                                                                                                                                                                                                                                                                                                                                                                                                                  |       |
|                              | Disturbance-generator DAQ: 4 $\times$ PWM out, 2–4 $\times$ AO out, 8 $\times$ AI in; 1 kHz synchronized logging; isolated outputs                                                                                                                                                                                                                                                                                                                                                                  |       |
|                              | Integrated Control & Automation Software Suite: Provides a configurable environment for equipment control, data acquisition, and real-time monitoring. Supports user-defined command execution through an intuitive GUI for easy operation and workflow customization. Includes driver-level compatibility with standard laboratory interfaces and supports seamless integration with diverse hardware. Enables rapid deployment of control routines and scalable expansion for future instruments. |       |
|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |
| <b>Safety</b>                | Laser eyewear OD $\geq 6$ @ 532 nm & 1064 nm, EN207/ANSI Z136                                                                                                                                                                                                                                                                                                                                                                                                                                       | 8     |
|                              | Lockout tags, signage, operational light - Qty as needed                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1 set |
|                              | Interlocked shutters, emergency stop, beam enclosures - Qty as needed                                                                                                                                                                                                                                                                                                                                                                                                                               | 1 lot |
|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |
| <b>Computers</b>             | laptop 14–15" FHD, i7/i9, 32 GB RAM, 1 TB SSD(NVMe), GPU; IP-rated rugged case; USB-C/USB-A; 10 h                                                                                                                                                                                                                                                                                                                                                                                                   | 1     |
|                              | Workstations i9/AMD-99XX, $\geq 64$ GB RAM, dual SSD (NVMe), 2 TB HDD, NVIDIA RTX, 10 GbE LAN, Win/Linux, 1200 W PSU                                                                                                                                                                                                                                                                                                                                                                                | 2     |

| LONG RANGE IN-LINE DIAGNOSTIC COMPONENTS |                                                                                                                                                                     |       |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| <b>Spectrometer</b>                      | NIR: InGaAs detector, 900–1700 nm range, optimized for 1064/1070 nm, resolution $\leq 0.6$ nm with 25–50 $\mu\text{m}$ slit, USB interface, line rate $\geq 100$ Hz | 2     |
|                                          | VIS: 350–750 nm range, resolution $\leq 0.6$ nm, USB interface, multiple slit options, optimized for 532 nm,                                                        | 1     |
|                                          |                                                                                                                                                                     |       |
| <b>Fiber Optic components</b>            | Core Splicing & Cleaver Kit: SM/PM capability, splice loss $\leq 0.02$ dB (SM), heater and fiber holders for 125 $\mu\text{m}$ cladding                             | 1     |
|                                          | Splice Protection Sleeves: UV-stable polyolefin, 60 mm & 40 mm lengths, high-temperature adhesive                                                                   | 1 set |
|                                          | Splice Trays & Organizer: 24/48-fiber trays, 1U/2U rack compatible, bend radius $\geq 30$ mm, label kit included,                                                   | 1 set |
|                                          | SM Patch Cable, $\sim 405$ nm, FC/PC, $\varnothing 3$ mm Jacket, 2 m Long                                                                                           | 2     |
|                                          | SM Patch Cable, $\sim 532$ nm, FC/PC, $\varnothing 3$ mm Jacket, 2 m Long                                                                                           | 2     |
|                                          | SM Patch Cable, $\sim 632.8$ nm, FC/PC, $\varnothing 3$ mm Jacket, 2 m Long                                                                                         | 2     |
|                                          | 1x2 Narrowband FO Coupler, $1310 \pm 15$ nm, 50:50 Split, FC/APC                                                                                                    | 1     |
|                                          | Fiber Polarization Controller, 3 $\varnothing 27$ mm Paddles, No Fiber                                                                                              | 1     |
|                                          | Fiber Isolator, 1310 nm, SM, FC/APC                                                                                                                                 | 1     |
|                                          | Single Mode Optical Fiber, 980 - 1600 nm, Extra-High Performance, $\varnothing 125$ $\mu\text{m}$ Cladding                                                          | 12m   |
|                                          | 400 - 680 nm PM Fiber w/ Pure Si Core, 0.12 NA, 3.3 - 4.6 $\mu\text{m}$ MFD                                                                                         | 12m   |
|                                          |                                                                                                                                                                     |       |
| <b>Beam Splitter</b>                     | 1" Polarizing Beamsplitter Cube, 532 nm                                                                                                                             | 2     |
|                                          | 1", 50:50 Non-Polarizing Beamsplitter Cube, 400 - 700 nm                                                                                                            | 4     |
|                                          | 1", 50:50 Non-Polarizing Beamsplitter Cube, 1100 - 1600 nm                                                                                                          | 1     |
|                                          |                                                                                                                                                                     |       |
| <b>Beam Expander</b>                     | 3X UVFS High-Power Beam Expander, V-Coated for 532 nm                                                                                                               | 1     |
|                                          | 3X UVFS High-Power Beam Expander, V-Coated for 1064 nm                                                                                                              | 1     |
|                                          |                                                                                                                                                                     |       |
| <b>Laser &amp; Accessories</b>           | Collimated Laser-Diode-Pumped DPSS Laser Module, 532 nm, 4.5 mW, Round Beam, $\varnothing 11$ mm Housing                                                            | 1     |
|                                          | DPSS Laser: 532 nm, 10 mW output power, A-Pin package                                                                                                               | 1     |
|                                          | Collimated Laser Diode Module, 405 nm, 4.5 mW, Elliptical Beam, $\varnothing 11$ mm Housing                                                                         | 1     |
|                                          | Self-Contained HeNe Laser, 632.8 nm, 0.8 mW, Fluctuating Polarization, 230 VAC Power Supply                                                                         | 1     |

|                    |                                                                                                                             |   |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------|---|
|                    | 1064 nm Fiber-Pigtailed Laser Diode: Output power 50 mW, FC/PC connector                                                    | 1 |
|                    | SM Benchtop SLD Source, 1310 nm, 12.5 mW,                                                                                   | 1 |
|                    | 250 mA Precision Constant Current Laser Driver for SLD Source                                                               | 1 |
|                    | TE-Cooled Mount for Ø5.6 mm Laser Diodes with A/B/C/D/E/G/H Pin Codes, 1/4"-20 Taps                                         | 1 |
|                    |                                                                                                                             |   |
| <b>Collimator</b>  | FC/APC Fiber Collimator: 633 nm, f=18.24 mm, NA=0.15                                                                        | 2 |
|                    | 532 nm, f = 7.86 mm, NA = 0.51 FC/PC Fiber Collimation Pkg.                                                                 | 2 |
|                    | 543 nm, f = 10.90 mm, NA = 0.25 FC/PC Fiber Collimation Pkg.                                                                | 2 |
|                    | 1310 nm, f =11.26 mm, NA = 0.25 FC/APC Fiber Collimation Pkg.                                                               | 3 |
|                    |                                                                                                                             |   |
| <b>Lens</b>        | N-BK7 PCV Lens (Ø2"): f=-100 mm, AR coating 1050-1700 nm                                                                    | 5 |
|                    | N-BK7 PCV Lens (Ø1"): f=-100 mm, AR coating 1050-1700 nm                                                                    | 5 |
|                    | N-BK7 PCV Lens (Ø25 mm): f=-100 mm, AR coating 350-700 nm                                                                   | 1 |
|                    | N-BK7 Bi-CV Lens: Ø25.4 mm, f=-100 mm, AR coating 1050-1700 nm                                                              | 5 |
|                    | N-BK7 Aspheric Lens: Ø100 mm, f=100 mm, NA=0.48, ARC 1050-1700 nm                                                           | 1 |
|                    | N-BK7 Aspheric Lens: Ø100 mm, f=200 mm, NA=0.23, ARC 1050-1700 nm                                                           | 3 |
|                    | UVFS Bi-CX Lens: Ø1", f=50 mm, AR coating 350-700 nm                                                                        | 5 |
|                    | PCX Lens 1" f=25 mm (VIS AR)                                                                                                | 4 |
|                    | PCX Lens 1" f=100 mm (VIS AR)                                                                                               | 4 |
|                    | N-BK7 PCX Lens, Ø2", f = 200 mm, AR Coating: 1050 - 1700 nm                                                                 | 2 |
|                    | N-BK7 Bi-CX Lens, Ø1", f = 50.0 mm, ARC: 1050 - 1700 nm                                                                     | 2 |
|                    | Box with 10 OD (0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 1.0, 2.0, 3.0, 4.0) Reflective ND Filters, Ø25 mm, SM1 Mounted, 350 - 1100 nm | 1 |
|                    |                                                                                                                             |   |
| <b>Mirror</b>      | UV Mirror: Ø1", 262-266 nm wavelength range, 0-45° AOI                                                                      | 5 |
|                    | Ø1" Nd:YAG Mirror, ~ 532 nm, 0° to 45° AOI                                                                                  | 5 |
|                    | Ø1" Nd:YAG Mirror, ~1064 nm, 0° to 45° AOI                                                                                  | 5 |
|                    | 532 nm $\lambda/4$ Plate: 1/2" optic in 1" mount, multi-order                                                               | 3 |
|                    | Ø1" Protected Gold Mirror; >96% for 800 nm - 20 $\mu$ m; Fused Silica                                                       | 2 |
|                    |                                                                                                                             |   |
| <b>Wave Plates</b> | Ø1/2" Zero-Order Quarter-Wave Plate, Ø1" Mount, 532 nm                                                                      | 1 |
|                    | Ø1/2" Zero-Order Quarter-Wave Plate, Ø1" Mount, 633 nm                                                                      | 1 |

|                       |                                                                                                                                                                                                                        |   |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|                       | Ø1/2" Zero-Order Half-Wave Plate, Ø1" Mount, 532 nm                                                                                                                                                                    | 1 |
|                       | Ø1/2" Zero-Order Half-Wave Plate, Ø1" Mount, 633 nm                                                                                                                                                                    | 1 |
|                       | Ø1" Zero-Order Half-Wave Plate, SM1-Threaded Mount, 1064 nm                                                                                                                                                            | 1 |
|                       |                                                                                                                                                                                                                        |   |
| Mounts & Cages        | Translating Lens Mount for Ø1" Optics, 1 Retaining Ring Included                                                                                                                                                       | 1 |
|                       | Kinematic Mirror Mount for Ø1" Optics                                                                                                                                                                                  | 1 |
|                       | Ø1" Motorized Precision Rotation Stage (Metric)                                                                                                                                                                        | 1 |
|                       | 30 mm to 16 mm Cage Adapter Plate, M4 Tap                                                                                                                                                                              | 1 |
|                       | Complete Periscope Assembly for Ø1" Optics; 360° Continuous Rotation with ±4° Tip and Tilt; Min and Max Beam Heights <50 mm and >100mm; Includes Ø25.0 mm, M6 Taps, L = 150 mm Pillar Post and Universal Clamping Fork | 1 |
|                       | 30 mm Cage System Adjustable Slit, M4 Tap, Metric Micrometre                                                                                                                                                           | 1 |
|                       | Large Motorized Goniometer, 25.4 mm Distance to Point of Rotation, ±8°                                                                                                                                                 | 1 |
|                       | SM1-Threaded Precision Kinematic Mirror Mount for Ø1" Optics, 3 Adjusters                                                                                                                                              | 6 |
|                       |                                                                                                                                                                                                                        |   |
| <b>Detectors</b>      | Silicon Variable-Gain APD: 400–1000 nm spectral range, 1–1600 MHz bandwidth                                                                                                                                            | 1 |
|                       | Fiber-Coupled Balanced Amp. Photodetector, 400 MHz, InGaAs, 1300 nm, AC Coupled                                                                                                                                        | 1 |
|                       | AOM 3080-125: Operating freq. range 80–350 MHz, RF power handling up to 4 W, includes RF driver accessories, mounts                                                                                                    | 1 |
|                       |                                                                                                                                                                                                                        |   |
| <b>Power Supplies</b> | K-Cube Brushed DC Servo Motor Controller                                                                                                                                                                               | 1 |
|                       | 15 V, 2.66 A Power Supply Unit with 3.5 mm Jack Connector for One K- or T-Cube                                                                                                                                         | 1 |
|                       | ±12 VDC Regulated Linear Power Supply, 6 W,                                                                                                                                                                            | 3 |

## **Section 5- Technical Bid**

The technical bid should furnish all requirements of the tender along with all annexures in this section and be submitted to:

The Chairman  
Department of Aerospace Engineering,  
Indian Institute of Science Bengaluru – 560012, India

with mention of 'Kind attn. Prof. Radhakant Padhi'

## Annexure-1:

### Details of the Bidder

The bidder must provide the following mandatory information & attach supporting documents wherever mentioned:

| Sl. No | Items                                                                                            | Details |
|--------|--------------------------------------------------------------------------------------------------|---------|
| 1.     | Name of the Bidder                                                                               |         |
| 2.     | Nature of Bidder (Attach an attested copy of the Certificate of Incorporation/ Partnership Deed) |         |
| 3.     | Registration No/Trade License (attach attested copy)                                             |         |
| 4.     | PAN No. (attach copy)                                                                            |         |
| 5.     | GST No. (attach copy)                                                                            |         |
| 6.     | Complete contact details (address, mobile no. / telephone no. / Email ID /website address)       |         |
| 7.     | Details of the contact person, address, mobile number, email ID, etc.                            |         |
| 8.     | Category – (a) OEM, (b) OEM authorized distributor (mention clearly), (c) Another Supplier       |         |
| 9.     | Authorization letter by the OEM (Yes / No)                                                       |         |
| 10.    | Bank Account Details (Attach a copy of a cancelled cheque or a letter from the bank.)            |         |

Signature of the Bidder

Name

Designation, Seal

Date:

## **Annexure-2:**

### **Declaration Regarding Experience**

To,

The Chairman,  
Department of Aerospace Engineering,  
Indian Institute of Science,  
Bengaluru – 560012, India

**Ref: Tender No: AE/ENQ/TNDR/RP/2627/01**

**Dated: 27/07/2026**

**Subject:** Supply and installation of **CLOSED LOOP WAVEFRONT RECONSTRUCTION ALGORITHM DEVELOPMENT TEST BED** at Department of Aerospace Engineering, IISc Bengaluru.

Respected Chair,

I have carefully reviewed the Terms & Conditions in the above-referred tender. I hereby declare that my company/firm has \_\_ years of experience in supplying and installing the proposed equipment.

(Signature of the Bidder)

Printed Name

Designation, Seal

Date:

## Annexure-3:

### Declaration regarding track record

To,  
The Chairman,  
Department of Aerospace Engineering,  
Indian Institute of Science,  
Bengaluru – 560012, India

**Ref: Tender No: AE/ENQ/TNDR/RP/2627/01**

**Dated: 27/07/2026**

Dear Sir/Madam

I have carefully reviewed the Terms & Conditions in the above-referred tender. I hereby declare that my company/ firm is not currently debarred/blacklisted by any Government / Semi-Government organizations/institutions in India or abroad. I further certify that I am a competent officer in my company/firm to make this declaration.

Or

I declare that my firm is debarred/blacklisted as per following details:

| S.No | Country in which the company is Debarred/blacklisted / case is Pending | Blacklisted/debarred by Government / Semi-Government/Organizations/ Institutions | Reason | Since when and for how long |
|------|------------------------------------------------------------------------|----------------------------------------------------------------------------------|--------|-----------------------------|
|      |                                                                        |                                                                                  |        |                             |

(NOTE: In case the company/firm was blacklisted previously, please provide the details regarding the period for which the company/firm was blacklisted and the reason/s for the same).

Yours faithfully

(Signature of the Bidder)

Name

Designation, Seal

Date:

## **Annexure – 4:**

### **Declaration for acceptance of terms and conditions**

To,  
The Chairman,  
Department of Aerospace Engineering,  
Indian Institute of Science,  
Bengaluru – 560012, India

**Ref: Tender No: AE/ENQ/TNDR/RP/2627/01**

**Dated: 27/07/2026**

Dear Sir/Madam

I have carefully reviewed the Terms & Conditions mentioned in the above-referred tender document. I declare that all the provisions of this tender document are acceptable to my company. I further certify that I am an authorized signatory of my company and am, therefore, competent to make this declaration.

One copy of this tender document (duly sealed and signed on all pages) is being attached to this bid.

Yours faithfully,

Seal & Signature with name & date and PAN & Aadhar card no. of the signatory.

Annexure – 5A:

Details of items quoted with technical specifications:

1. Technical Compliance Table

| S.No. | Product Name                        | OEM<br>Company<br>Name | Part/Catalogue<br>Number | Product<br>Description | Detailed technical specifications (Use required<br>number of sub-rows for each parameter) |      |                                       |                   | Compliance<br>“Yes/No” | Remarks |
|-------|-------------------------------------|------------------------|--------------------------|------------------------|-------------------------------------------------------------------------------------------|------|---------------------------------------|-------------------|------------------------|---------|
|       |                                     |                        |                          |                        | Specification<br>parameter                                                                | Unit | Desired<br>value (as<br>in<br>Tender) | Proposed<br>value |                        |         |
| 1     |                                     |                        |                          |                        |                                                                                           |      |                                       |                   |                        |         |
| 2     |                                     |                        |                          |                        |                                                                                           |      |                                       |                   |                        |         |
| 3     |                                     |                        |                          |                        |                                                                                           |      |                                       |                   |                        |         |
|       | Accessories<br>(essential/optional) |                        |                          |                        |                                                                                           |      |                                       |                   |                        |         |
|       |                                     |                        |                          |                        |                                                                                           |      |                                       |                   |                        |         |
|       |                                     |                        |                          |                        |                                                                                           |      |                                       |                   |                        |         |
|       | Spares                              |                        |                          |                        |                                                                                           |      |                                       |                   |                        |         |
|       |                                     |                        |                          |                        |                                                                                           |      |                                       |                   |                        |         |
|       |                                     |                        |                          |                        |                                                                                           |      |                                       |                   |                        |         |

2. Product brochures and user manuals (add all relevant documents here).

## **Annexure 5B – Optical System Layout**

Bidders shall provide a detailed ray diagram showing beam propagation from laser source to diagnostics, including beam conditioning optics, FSM, DM, turbulence chamber, relay optics, WFS, cameras, beam splitters, dichroic, timing interfaces, and closed-loop control architecture.

## Annexure 6 – Commercial Bid

The commercial bid should be furnished with all requirements of the tender with supporting documents as mentioned:

To,  
The Chairman,  
Department of Aerospace Engineering,  
Indian Institute of Science,  
Bengaluru – 560012, India

Ref: Tender No **AE/ENQ/TNDR/RP/2627/01** Dated: **22/07/2026**

Dear Sir/Madam,

| S. No | Description                                                 | Catalogue No. | Quantity | Unit Price | Sub Total |
|-------|-------------------------------------------------------------|---------------|----------|------------|-----------|
| 1.    | Essential items noted in the technical specification        |               |          |            |           |
| 1.a   |                                                             |               |          |            |           |
| 1.b   |                                                             |               |          |            |           |
| 1.c   |                                                             |               |          |            |           |
| 2.    | Optional items noted in the technical specification         |               |          |            |           |
| 2.a   | ... (details of essential items)                            |               |          |            |           |
| 2.b   | ...                                                         |               |          |            |           |
| 3.    | Accessories for operation and installation                  |               |          |            |           |
| 4.    | All consumables, spares and software to be supplied locally |               |          |            |           |
| 5.    | Warranty (3 years)                                          |               |          |            |           |
| 6.    | AMC 3 years beyond warranty                                 |               |          |            |           |
| 7.    | Cost of Insurance and Airfreight                            |               |          |            |           |
| 8.    | FOR IISc, Bengaluru                                         |               |          |            |           |

Any additional items, such as Spares, Hardware/PCBs Likely to go obsolete after the next 3 Years

| S.No | Description | Cat. Number | Quantity | Unit Price | Sub total |
|------|-------------|-------------|----------|------------|-----------|
|      |             |             |          |            |           |
|      |             |             |          |            |           |

## Annexure 7 –

### Declaration of Local Content by Local Supplier

**Subject:** Public Procurement (Preference to Make in India)

**References:**

Preference to Make in India, including counteroffering, will be as per the Public Procurement (Preference to Make in India) Order 2017, available in the following links

<https://dipp.gov.in/publicprocurements>

[http://dipp.nic.in/sites/default/files/publicProcurement\\_MakeinIndia\\_15June2017.pdf](http://dipp.nic.in/sites/default/files/publicProcurement_MakeinIndia_15June2017.pdf)

[http://dipp.nic.in/sites/default/files/Revised-PPP-MII-Order-2017\\_28052018.pdf](http://dipp.nic.in/sites/default/files/Revised-PPP-MII-Order-2017_28052018.pdf)

[https://dipp.gov.in/sites/default/files/PPP-MII%20Order%20dt%2029th%20May%2019\\_0.pdf](https://dipp.gov.in/sites/default/files/PPP-MII%20Order%20dt%2029th%20May%2019_0.pdf)

<https://dipp.gov.in/sites/default/files/PPP%20MII%20Order%20dated%204th%20June%202020.pdf>

We hereby declare with reference to the above subject and references that **M/s -----**

(Tick whichever is applicable as below)

"Class-I local supplier" meeting the requirement of minimum local content equal to 50% (fifty percent) or more defined in the above government notification for the goods and services.

(or)

"Class-II local Supplier" meeting the requirement of local content 20% to less than 50% (fifty percent) defined in the above government notification for the goods and services

(or)

Non-Local supplier (If not belonging to Class-I & Class-II)

Please mention the details about the following:

**Enquiry no:** \_\_\_\_\_ **dated.** \_\_\_\_\_

**Type of Supplier (Class-I/Class-II)** \_\_\_\_\_

**Product:** \_\_\_\_\_

**Project:** \_\_\_\_\_

Details of the location at which local value addition will be made are as follows: \_\_\_\_\_

We also understand that the false declarations will be in breach of the code of Integrity under rule 175(1)(i)(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.

**Authorized Signature M/s -----**

(Signature and stamp)

Place: \_\_\_\_\_

Date: \_\_\_\_\_

## Section 6 – Checklist

**(This should be enclosed with a technical bid- Part A)**

The following items must be checked before the Bid is submitted:

### **Sealed Envelope "A": Technical Bid**

Annexure 5- Technical Bid (each page signed by the authorized signatory and sealed) with the following annexures:

- a) Annexure 1: Bidders' details
- b) Annexure 2: Declaration regarding experience
- c) Annexure 3: Declaration regarding clean track record
- d) Annexure 4: Declaration for acceptance of terms and conditions
- e) Annexure 5: Details of items quoted.
- f) Annexure 7: Declaration of Local Content by Local Supplier.

Copy of this tender document duly signed by the authorized signatory on every page and sealed.

All Annexures are to be submitted on the company letterhead by the supplier.

### **Sealed Envelope "B": Commercial Bid**

Annexure 6: Commercial Bid

Your quotation must be submitted in two envelopes: **Technical Bid (Envelope A)** and **Commercial Bid (Envelope B)**, clearly indicating the Tender description, Tender No., and the due date on both envelopes. These should be sealed and placed inside a larger envelope, which must also be sealed and appropriately marked with the Tender No., Tender description, and Due Date.