

**GOVERNMENT OF INDIA
DEPARTMENT OF SPACE
VIKRAM SARABHAI SPACE CENTRE (VSSC)
THIRUVANANTHAPURAM**

Tender for High-Energy Flash-lamp pumped Q-switched Nd:YAG Laser System and its Accessories for Atmospheric Lidar Application

Bids to be submitted online

Tender No.: VSSC/PURCHASE UNIT II (AVN)/VS202400286901 dated 26-08-2024

A. Tender Details

Tender No : **VSSC/PURCHASE UNIT II (AVN)/VS202400286901**

Tender Date : **26-08-2024**

Tender Classification: **GOODS**

Purchase Entity : **PURCHASE UNIT II (AVN)**

Centre : **VIKRAM SARABHAI SPACE CENTRE (VSSC)**

High-Energy Flash-lamp pumped Q-switched Nd:YAG Laser System and its Accessories for Atmospheric Lidar Application

High-Energy Flash-lamp pumped Q-switched Nd:YAG Laser System and its Accessories for Atmospheric Lidar Application

A.1 Tender Schedule

Bid Submission Start Date : **29-08-2024 14:00**

Bid Clarification Due Date : **10-09-2024 12:00**

Bid Submission Due Date : **30-09-2024 14:00**

Bid Opening Date : **30-09-2024 15:00**

Price Bid Opening Date : **10-10-2024 15:00**

B. Tender Attachments

Technical Write-up/Drawings

Document : General Description and Terms and Conditions

Instructions To Vendors

2. Conditions for BIDDER FROM A COUNTRY WHICH SHARES LAND BORDER WITH INDIA - Restrictions under Rule 144 (XI) in GFR, 2017.

1. Any bidder from a country which shares a land border with India will be eligible to bid in this tender, only if the bidder is registered with the Competent Authority. Competent Authority for the purpose of registration shall be the Registration Committee constituted by the Department for Promotion of Industry and Internal Trade (DPIIT).

2. Any false declaration and non-compliance of the above would be a ground for immediate rejection of offer or termination of the contract and further legal action in accordance with the laws.

3. Validity of Registration: Registration should be valid at the time of submission of bids and should be valid at the time of placement of order.

3. PPP Make in India(Divisible Items-Class I & II Local Suppliers)

1. A committee (with an external expert from a practicing cost accountant or practicing chartered accountant, if required) constituted for independent verification shall verify the self-declarations & auditor's / accountant's certificates on random basis, as per the requirements.

2. a) The subject item falls under divisible category. b) The offers are sought from Class I & II Local Suppliers.

3. Definitions: A supplier or service provider, whose goods, services or works offered for procurement, has local content: i. Equal to or more than 50%: Class-I local supplier. ii. More than 20% but less than 50%: Class-II local supplier. iii. Less than or equal to 20%: Non-local supplier.

4. False declarations will be in breach of code of the integrity for which a bidder or its successor's will not be eligible/debarred for purchase preference from further tenders / pending tenders for two years along with other actions as may be applicable.

5. In case of a complaint received from any local supplier indicating a need for review / verification of Local content of successful vendor / awarded vendor, for accepting a complaint from such complainant (w.r.t the false declaration given by the successful vendor on the local content), a complaint fee of Rs.2Lakhs or 1% of the locally manufactured items being procured (subject to a maximum Rs. 5Lakhs), whichever was higher, to be paid by demand draft by the complainant. In case, the complaint is found to be incorrect, the complaint fee shall be forfeited. In case, the complaint is upheld and found to be substantially correct, deposited fee of the complainant would be refunded without any interest.

6. In cases the quoted price is in excess of Rs.1000 Lakhs (including duties, taxes and freight & Insurance) the 'Class-I & II local supplier shall provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in case of suppliers other than companies) giving the percentage of local content.

7. In line with Public Procurement (Preference to Make in India), Order 2017 & its amendments issued by Govt. of India from time to time with a view to support the Indian industries, ISRO has implemented "Purchase Preference Policy". The "Purchase Preference" is applicable for the "Class-I Local Supplier" for the goods/ services/ works covered in this tender, subject to the following terms & conditions:-

8. 'L1' means the lowest technically accepted tender / bid / quotation (i.e. lowest landed cost including duties, taxes and freight & Insurance).

9. 'Local content' means the amount of value added in India (i.e. indigenous items/services added in the offered products/ services/ works) be the total value of the item offered (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties/IGST) as a proportion of the total value (excluding net domestic indirect taxes), in percent.

10. 'Margin of purchase preference' means the maximum extent to which the price quoted by the "Class-I local supplier" above the L1 (landed cost).

11. Purchase Preference Policy:- Goods/Works which are divisible in nature (required quantity is greater than 1 or not a package basis):

i.If L1 is 'Class-1 local supplier', the order/contract for full quantity shall be awarded to L1 bidder.

ii.If L1 bid is not from a 'Class-I local supplier', 50% of the order quantity shall be awarded to L1.

Thereafter, the lowest bidder among the 'Class-I local supplier' will be invited to match the L1 price for the remaining 50% quantity subject to the Class-I local supplier's quoted price falling within the margin of purchase preference (i.e. 20%) and contract for that quantity shall be awarded to such Class-I local supplier subject to matching the L1 price (inclusive of duties, taxes and freight & insurance).

iii.In case such lowest eligible 'Class-I local supplier' fails to match the L1 price or accepts less than the offered quantity, the next higher 'Class-I local supplier' within the margin of purchase 'preference shall be invited to match the L1 price for remaining quantity and so on, and contract shall be awarded

accordingly. In cases where none of the 'Class-I local supplier' within the margin of purchase agree to match L1 price, in such cases 100% quantity shall be ordered on original L1 bidder.

iv. In case no offers are received from 'Class-I local supplier' or none of the 'Class-I local supplier' falls within the margin of purchase preference of 20%, the order shall be processed on L1 vendor.

v. In case L1 bidder (not a 'Class-I local supplier') is not accepting splitting of order on 50:50 basis, in that case the order/contract shall be awarded to such 'Class-I local supplier' for full quantity subject to matching the L1 price.

vi. Regarding MSEs (Indian vendors):

a) The following additional aspect as indicated below would be applicable for procurement which are falls under divisible category (i.e., not applicable for indivisible category), in case of participation of MSEs in the tendering who are also complying to the Minimum Local Content (MLC) stipulated in the tender.

b) If any Indian vendor satisfies the requirement of MSEs stipulation and also falls within the purchase preference margin as called for in MSME policy (in case of matching L1 price) will be considered for ordering 25% of tendered quantity, the balance quantity / works will be considered for distribution amongst all bidders (including MSEs) as per the purchase preference policy.

c) In case no MSEs qualifies for purchase preference or do not match with L1 price then the total tendered quantity will be distributed amongst all bidders as per the purchase preference policy.

12. The 'Class-I & II local supplier' should provide a "Self Certification" along with technical offer indicating that the item offered meets the minimum local content [as per Sl. No.(3)] as called for in the tender and provide the percentage of local content along with details of the location(s) at which the local value addition is made. In case of two bid tenders, it is mandatory to indicate compliance to MLC(minimum Local Content) in technical bid zone.

13. The ink-signed certificate shall be provided on vendors letter head along with the offer (in case of online tender, copy of ink-signed certificate shall be uploaded along with your offer under concerned tab. Original in Hard copy shall be produced on request). In case of non-submission of certificate, the purchase preference shall not apply.

14. The margin of Purchase Preference shall be up to 20%.

15. The Public Procurement (Preference to Make in India), Order 2017 issued by Govt. of India indicates that if there are any general or specific restrictive clauses to restrict participation of Indian companies in those countries procurement tenders, reciprocity clause need to be invoked as per the order. Hence, if ISRO or Govt. of India come across that Indian suppliers of an item are not allowed to participate and / or compete in procurement by your government, the bid submitted by you will be not be considered and excluded from eligibility for procurement. Please note this point.

16. Works means all works as per Rule 130 of GFR- 2017, and will also include 'turnkey works'. Works includes Engineering, Procurement and Construction (EPC) contracts and services include

System Integrator (SI) contracts.

C. Bid Templates

C.1 Technical Bid - High-Energy Flash-lamp pumped Q-switched Nd:YAG Laser System and its Accessories for Atmospheric Lidar Application

1. High Power LASER Systems: High-energy Flash-lamp pumped Q-switched Nd:YAG Laser System with frequency doubling, emitting @ 532 nm wavelength including Power Supply and other essential accessories, for Atmospheric Lidar Application

Item specifications for High Power LASER Systems

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Application	To be used as a laser transmitter of a lidar system for atmospheric profiling [Provide details of specifications including make and model]	Yes / No / Explain		
2	Type of the laser	High-energy, Pulsed, Flash-lamp pumped, Q-switched, solid state laser [Provide details of the offered laser]	Yes / No / Explain		
3	Pulsed Laser Source	Nd:YAG [Provide details]	Yes / No / Explain		
4	Emitting wavelength	532 nm [Provide value]	Yes / No / Explain		
5	Wavelength Separation Package	Suitable Wavelength Separation Package for operating at 532 nm, including the Harmonic Generator [Provide details]	Yes / No / Explain		
6	Average Energy per pulse at 532 nm	≥ 800 mJ [Provide the value for the offered laser]	Yes / No / Explain		
7	Average Power at 532 nm	≥ 24 Watt [Provide the value of average power at 532 nm, and the Pulse Repetition Frequency (PRF) for the offered laser]	Yes / No / Explain		

8	Pulse Width at 532 nm	5 - 10 ns [Any value within this range is acceptable. Provide the value for the offered laser]	Yes / No / Explain		
9	Power drift at 532 nm	≤ 6% for 8 hours of operation [Provide the value for the offered laser.]	Yes / No / Explain		
10	Energy Stability at 532 nm	Better than ±4% (shot-to-shot stability) [Provide the value for the offered laser]	Yes / No / Explain		
11	Beam diameter at 532nm	10 ± 2 mm [Provide the value for the offered laser]	Yes / No / Explain		
12	Beam divergence (Full angle) at 532nm	≤ 0.5 mrad at full angle for 1/e ² [Provide the value for the offered laser]	Yes / No / Explain		
13	Beam pointing stability at 532nm	≤ ±40 μrad [Provide the value for the offered laser]	Yes / No / Explain		
14	Beam spatial profile (Fit to Gaussian)	Better than 0.7 in the near field (<1m) and better than 0.95 in the far field, and least square fit to Gaussian profile [Gaussian profile is mandatory (Hat top profiles are not acceptable). Provide the details of the Gaussian beam profile for the offered laser, including the sample burn paper patterns. The beam patterns should not display "hot spots" at 532 nm]	Yes / No / Explain		
15	Polarization at 532 nm	Linear polarization with purity ≥ 99% [Provide the details of laser polarisation (vertical or horizontal) including degree of polarization (%) at 532 nm]	Yes / No / Explain		
16	Line width at 532 nm	≤ 1 cm ⁻¹ (unseeded) [Provide the value of linewidth in cm ⁻¹]	Yes / No / Explain		

17	Temporal Jitter	± 0.5 ns or better (unseeded) [Provide the value for the offered laser]	Yes / No / Explain		
18	Warranted Lamp Lifetime	~30 million shots or higher [Provide the value for the offered laser]	Yes / No / Explain		
19	Laser control system	Adequate control system for laser control, data acquisition and power meter measurements, with display unit for data visualization, and provision for hard copy generation of laser beam characteristics. The system should have pre-installed laser control software, suitable for Windows OS, with remote module / ethernet / RS232 / USB interface for laser control. The system should be rugged enough for continuous daily operation. [Provide details of offered system and its interface]	Yes / No / Explain		

20	Laser sync signals	Laser has to generate the sync signal / trigger pulse which will be used for driving the lidar data acquisition system, having a 1 kilo-Ohm input impedance. The offered laser should produce a positive trigger pulse that exceeds +2.5V amplitude (better +3.3V...+5V) for more than 150 ns, and drive the required 1 kilo-Ohm input impedance. Rise time of the trigger pulse should be less than 20 ns. [Provide the details of laser trigger/sync signals for the offered laser, and confirm the compliance with the trigger requirements stated]	Yes / No / Explain		
21	Dimensions of Laser Head	As compact as possible is preferred [Provide details of dimensions and weight]	Yes / No / Explain		
22	Power supply	Suitable Laser Power Supply should be provided, with all the necessary cables and connectors. Laser head must have detachable umbilical cord from the power supply. [Provide details of dimensions and power requirements]	Yes / No / Explain		
23	Electrical Power requirements	Suitable to Indian power conditions (220 V, 50 Hz) [Provide the electrical power requirements for the installation and operation of the laser system]	Yes / No / Explain		

24	Laser Accessories	All essential laser accessories such as burn papers, safety goggles, gloves, etc., should be provided [Provide list and quantity of accessories]	Yes / No / Explain		
25	Heritage of Lasers supplied for atmospheric lidar application	Offered system should have proven track-record for atmospheric lidar applications at reputed institutions, where same or higher version lasers are installed [Give supporting documents such as previous POs]	Yes / No / Explain		

Document : Specifications

2. LASER Accessories: Essential spares (items not covered under warranty) and consumables such as Flashlamps for Oscillator and Amplifiers, Cartridges/Filters etc., for operation of offered Laser System for 5000 hours

Item specifications for LASER Accessories

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Essential spares (items not covered under warranty) for the operation of the offered Laser System for 5000 hours	Specifications of spares suited to the offered laser system [List of items and quantity should be provided. Shelf life has to be clearly stated]	Yes / No / Explain		
2	Flashlamps for Oscillator, required for the operation of the offered Laser System	Quantity: 15 Nos.; Specifications of flashlamps (lamp life, shelf life, operational/storage conditions, etc.) suited to the offered laser system. [Shelf life and storage conditions have to be clearly stated]	Yes / No / Explain		

3	Flashlamps for Amplifiers*, required for the operation of the offered Laser System	Quantity: 30 Nos.; Specifications of flashlamps (lamp life, shelf life, operational/storage conditions, etc.) suited to the offered laser system [Shelf life and storage conditions have to be clearly stated.*Number of amplifiers in the offered laser is to be clearly specified]	Yes / No / Explain		
4	Cartridges/Filters required for the operation of the offered Laser System	Quantity: 10 Nos. Specifications of cartridges/filters suited to the offered laser system; [Shelf life and storage conditions have to be clearly stated]	Yes / No / Explain		
5	Any other essential consumables required for the operation of the offered Laser System for 5000 hours	Specifications suited to the offered laser system [List of items and quantity should be provided]	Yes / No / Explain		

Document : Specifications

3. LASER Accessories: Laser Chiller (adequate for the offered Laser System) with accessories

Item specifications for LASER Accessories

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Application	Adequate external laser chiller (for thermal management) should be supplied for the laser system. [Provide details including make and model. Chiller should be stand alone]	Yes / No / Explain		

2	Requirement	Chiller should be adequate for thermal management of the offered laser for continuous operation (i.e., > 10 hours uninterrupted operation per day). [Provide conformity with the requirement]	Yes / No / Explain		
3	Water flow and pressure for cooling	Specification suitable for the offered high-power laser system [Provide value]	Yes / No / Explain		
4	Cooling capacity	Minimum 5 TR [Provide value]	Yes / No / Explain		
5	Storage tank capacity	Minimum 50 L [Provide value (direct tap water connection will not be provided, hence storage tank is required)]	Yes / No / Explain		
6	Set temperature window	Specification suitable for the offered high-power laser system [Provide values]	Yes / No / Explain		
7	Accessories	All essential accessories required for the standalone chiller should be provided [Provide details]	Yes / No / Explain		
8	Power requirement	Suitable to Indian power conditions [Provide values]	Yes / No / Explain		
9	Spares and Consumables	All essential spares and consumables for the continuous operation of the laser chiller (for >10 hours per day) should be provided (Total operation: 2500 hours/year) [Provide the list and quantity of spares and consumables]	Yes / No / Explain		

10	Suitability for thermal management of offered laser system	External laser chiller should be adequate for the thermal management of the offered laser system. Note: The laser OEM has to certify that the chiller specifications offered in the bid are adequate to meet the thermal management requirements of the offered laser.	Yes / No / Explain		
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Document : Specifications

4. LASER Accessories: Laser Power and Energy Meter with sensor, display unit and accessories, adequate for the offered Laser System

Item specifications for LASER Accessories

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Laser Power and Energy Meter with Sensor and Display Unit	Suitable for measuring high power density pulsed lasers [Provide details including make and model]	Yes / No / Explain		
2	Spectral Range	0.3 to 1.1 μm or wider [Provide value]	Yes / No / Explain		
3	Sensor Aperture	≥ 20 mm [Provide value]	Yes / No / Explain		
4	Power Range	200 mW to 200 W or wider [Provide value]	Yes / No / Explain		
5	Power Accuracy	$\pm 3\%$ or better [Provide value]	Yes / No / Explain		
6	Energy Range	50 mJ to 5 J or wider [Provide value]	Yes / No / Explain		
7	Laser-Induced Damage Threshold (LIDT) of Sensor	> 2.5 J/cm ² at 532 nm, ~ 10 ns pulse width, ~ 30 Hz PRF [Provide value]	Yes / No / Explain		
8	Display	Appropriate digital display of power, energy, pulse rate and their statistics including energy and power stability [Provide details]	Yes / No / Explain		

9	PC Interface	USB-enabled; suitable software to be provided [Provide details]	Yes / No / Explain		
10	Accessories	All suitable cables, connectors, and batteries [Provide details]	Yes / No / Explain		

Document : Specifications

5. LASER Accessories: Laser Beam Expander (adequate for the offered Laser System) with accessories

Item specifications for LASER Accessories

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Application	For expanding the beam emanating from the laser head, in order to reduce the divergence [Provide details including make and model]	Yes / No / Explain		
2	Design Wavelength (DWL)	532 nm [Provide value]	Yes / No / Explain		
3	Input clear aperture	≥ 12 mm (about 2 mm greater than the input laser beam diameter of about 10 mm) [Provide value]	Yes / No / Explain		
4	Output beam diameter	~ 100 mm; Adequate expansion factor (X) is required to expand the laser beam diameter [Provide value of output beam diameter achievable and the expansion factor]	Yes / No / Explain		
5	Output beam divergence	< 0.1 milli-radians; Adequate expansion factor (X) is required to reduce the laser beam divergence [Provide value of output beam divergence achievable and the expansion factor]	Yes / No / Explain		

6	Substrate	Suitable material for High-energy pulsed lasers (> 800 mJ energy per pulse at 532 nm) [Provide details]	Yes / No / Explain		
7	Laser-Induced Damage Threshold (LIDT)	$\geq 4.5 \text{ J/cm}^2$ at 532 nm, ~10 ns pulse width, ~30 Hz PRF [Provide LIDT value and coating details]	Yes / No / Explain		
8	Angle of Incidence	0 deg	Yes / No / Explain		
9	Transmission	$\geq 95\%$ [Provide value]	Yes / No / Explain		
10	Transmitter Wavefront Error	P-V: $\lambda/10$ or better for ~10 mm input laser beam diameter [Provide value]	Yes / No / Explain		
11	Mount	Mount requirements are: (i) Beam expander has to be precisely aligned with the laser beam emanating from the laser head; (ii) Mounting height is to be determined as per height of the laser beam from table top for the offered laser system; (iii) Provision for fine adjustment/translation of the beam expander is preferable (height and position adjustment); Suitable mount at the laser beam height is to be provided. [Provide details of the mount]	Yes / No / Explain		

Document : Specifications

6. LASER Accessories: Laser Beam Steering Mirror (adequate for the offered Laser System) with Mounts and accessories, for steering the laser beam vertically into the atmosphere

Item specifications for LASER Accessories

SI No	Specification	Value	Compliance	Offered Specification	Remark
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1	Application	Reflecting Mirror for transmitting the expanded laser beam vertically into the atmosphere [Provide details including make and model]	Yes / No / Explain		
2	Design Wavelength (DWL)	532 nm [Provide details]	Yes / No / Explain		
3	Mirror Diameter	~200 mm (about 2 times expanded beam diameter) [Provide value]	Yes / No / Explain		
4	Substrate	Suitable material for High-energy pulsed lasers (> 800 mJ energy per pulse at 532 nm) [Provide details]	Yes / No / Explain		
5	Reflectance	≥ 99 % at 532 nm [Provide specification value offered. Provide details of mirror coatings]	Yes / No / Explain		
6	Surface Finish	P-V: $\lambda/10$ or better [Provide value]	Yes / No / Explain		
7	Angle of Incidence	45 degrees	Yes / No / Explain		
8	Laser-Induced Damage Threshold (LIDT) of mirror	≥ 1 J/cm ² at 532 nm, ~10 ns pulse width, ~30 Hz PRF [Provide LIDT value and coating details]	Yes / No / Explain		
9	Beam steering Mount – 2-axis Gimbal Mount (for scanning purpose)	Suitable two-axis Gimbal Mirror Mount, with large travel and fine adjustment capability in elevation and azimuth axes, with provision for locking. Coarse resolution: 0.1 deg or better; Fine resolution: 0.005 deg or better; Digital readout is preferred [Provide the elevation range and azimuth range, and their adjustment resolutions, including other specifications]	Yes / No / Explain		

10	Beam steering Mount – Kinematic Mount for 45 degree Mirror	Suitable Kinematic Mount to mount the Beam Steering Mirror at 45 deg, with +/-3 deg fine and coarse adjustment along elevation and azimuth. Coarse resolution: 0.1 deg or better; Fine resolution: 0.005 deg or better; Digital readout is preferred [Provide the mount specifications and adjustment resolutions]	Yes / No / Explain		
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Document : Specifications

Common Specifications (Applicable for all items)

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	High-energy Flash-lamp pumped Q-switched Nd:YAG Laser System with frequency doubling, emitting @ 532 nm wavelength, including Power Supply and other essential accessories, for atmospheric lidar application	Type: Flash-lamp pumped pulsed solid state laser; Laser Source: Nd:YAG; Wavelength: 532 nm; Average Energy per Pulse: ≥800 mJ at 532 nm; Average Power: ≥24 W at 532 nm; Pulse width: 5 – 10 ns; Beam Diameter: 10 ± 2 mm; Beam Divergence: ≤ 0.5 mrad (full angle); Polarization purity: ≥ 99%; Line width: ≤ 1/cm (unseeded); Electrical power requirements suitable to Indian conditions (220 V, 50 Hz)	Yes / No / Explain		

2	Spares and consumables	All essential spares (items not covered under warranty) and consumables should be provided. Flashlamps for Oscillator (Qty. 15 Nos.) and Flashlamps for Amplifiers (Qty. 30 Nos.), and Cartridges/Filters (Qty. 10 Nos.) should be provided. Other spares and consumables, if any, should be provided as required for the operation of the offered Laser System for 5000 hours [List of items and quantity offered should be provided along with detailed specifications]	Yes / No / Explain		
3	Laser Chiller (adequate for the offered Laser System) with accessories	Adequate external laser chiller (for thermal management) should be supplied, with sufficient cooling capacity for continuous operation of the offered laser system for > 10 hours per day. The laser OEM has to certify that the chiller specifications offered in the bid are adequate to meet the thermal management requirements of the offered laser.	Yes / No / Explain		
4	Laser Power and Energy Meter with sensor, display unit and accessories, adequate for the offered Laser System	Spectral Range: 0.3 to 1.1 μm or wider; Sensor Aperture: ≥ 20 mm; Power Range: 200 mW to 200 W or wider; Power Accuracy: $\pm 3\%$ or better; Energy Range: 50 mJ to 5 J or wider; LIDT of sensor: > 2.5 J/cm ² ; including all essential accessories.	Yes / No / Explain		

5	Beam Expander (adequate for the offered Laser System) with accessories	Design Wavelength: 532 nm; Input clear aperture: ≥ 12 mm; Output beam diameter: ~ 100 mm (adequate expansion factor X to be provided); Output beam divergence: < 0.1 milli-radians; LIDT: ≥ 4.5 J/cm ² at 532 nm, ~ 10 ns pulse width, ~ 30 Hz PRF; Angle of Incidence: 0 deg; Transmission: $\geq 95\%$; Transmitter Wavefront Error: P-V $\lambda/10$ or better, for ~ 10 mm input laser beam diameter; including suitable mount at the laser beam height	Yes / No / Explain		
6	Beam Steering Mirror (adequate for the offered Laser System) with mirror mounts and accessories	Design Wavelength: 532 nm; Mirror diameter: ~ 200 mm; Reflectance: $\geq 99\%$ at 532 nm; Surface Finish: P-V $\lambda/10$ or better; Angle of Incidence: 45 degrees; LIDT: ≥ 1 J/cm ² at 532 nm, ~ 10 ns pulse width, ~ 30 Hz PRF; Suitable two-axis Gimbal Mirror Mount, with large travel and fine adjustment capability in elevation and azimuth axes, with provision for locking (Coarse resolution: 0.1 deg or better; Fine resolution: 0.005 deg or better); Suitable Kinematic Mount to mount the Beam Steering Mirror at 45 deg, with ± 3 deg fine and coarse adjustment along elevation and azimuth (Coarse resolution: 0.1 deg or better; Fine resolution: 0.005 deg or better)	Yes / No / Explain		

Supporting Documents required from Vendor

1. Details and Terms & Conditions of warranty and 5-year non-comprehensive AMC (to be

submitted along with Techno-Commercial Bid Part-I, without price information)

- 2. Cost of 5-year non-comprehensive AMC including spares/consumables (to be submitted along with Price Bid - Part-II) (Price Bid Related)**
- 3. Split-up price for all the indented items, as per the prescribed format in Table-8 in the attached document (to be submitted along with Price Bid - Part-II) (Price Bid Related)**
- 4. List of Deliverables to be provided by the party, as per the prescribed format in Table-7 in the attached document (to be submitted along with Techno-Commercial Bid - Part I)**
- 5. The party has to provide the technical document of items along with the technical bid, which includes detail operational principle, specifications, make/model no. etc.**
- 6. Warranty period should be mentioned in the quote. A minimum warranty period of 12 months should be provided.**
- 7. Make/Model of the item should be included in the technical document**

5 additional documents can be uploaded by the vendor

C.2 Commercial Terms / Bid

Sl. No.	Description	Compliance	Vendor Terms
1	Bid Evaluation Criteria: Bid evaluation criteria include the cost of non-comprehensive AMC also.	Yes / No / Explain	
2	Quote Validity: The Bid should be valid for a minimum of 180 days from the date of opening of the Part-I. The party should clearly confirm the validity of their quote in the Techno-Commercial Bid (Part-I).	Yes / No / Explain	
3	Insurance: The party should be responsible for insuring the items until the delivery and completion of the installation, and the premium towards the same should be borne by the party.	Yes / No / Explain	
4	For imported items, valid Authorization Letter from the OEM/Principal should be provided along with valid licence while submitting the quote and this shall be attached with the Techno-Commercial Bid (Part-I).	Yes / No / Explain	
5	Payment Terms: Payment terms for supply and payment terms for installation, testing, and commissioning of the system should be indicated separately.	Yes / No / Explain	
6	Delivery Terms: All items/subsystems should be delivered at IPRC, Mahendragiri, Tamil Nadu. Delivery terms should be clearly stated in the Techno-Commercial Bid (Part-I).	Yes / No / Explain	
7	Combined Bank Guarantee for Security Deposit and Performance (equivalent to 3% of the total contract value) shall be submitted on receipt of PO/contract and valid till completion of standard warranty. BG shall be submitted along with order acceptance.	Yes / No / Explain	
8	Security Deposit (SD) & Performance Bank Guarantee (PBG): SD & PBG can be in the form of Bank Guarantee, DD, FDR etc	Yes / No / Explain	
9	Liquidated Damages: LD Clause @ 0.5% per week subject to a maximum 10% of order value is applicable beyond the promised schedule for supply, installation, testing, training and commissioning of the system.	Yes / No / Explain	

10	The party has to quote for all items and partial offerings will not be accepted. Bids will be evaluated considering the total cost of all items stated in the tender, including AMC charges.	Yes / No / Explain	
11	Being 2-part PT, the Techno-Commercial Bid (Part-I) should NOT contain any price information of any of the items or AMC charges. Bids having any price quoted in the Techno-Commercial Bid (Part-I) will be disqualified/summarily rejected.	Yes / No / Explain	
12	Party has to provide split-up price for all the indented items, in the Price Bid (Part-II) as per the prescribed format given in Table-8 of the attached document.	Yes / No / Explain	
13	Schedule/Timeline of the development, realization, testing at factory site, delivery, installation, testing & commissioning of the system at the installation site at IPRC, Mahendragiri, and training, should be clearly stated in the bid.	Yes / No / Explain	
14	Cost of non-comprehensive AMC will also be considered for the evaluation of price bids.	Yes / No / Explain	
15	Cost of 5-year non-comprehensive AMC and cost for spares and consumables for operation of the laser system and laser chiller for 5 years at 2500 hours/year, should be separately stated along with the Price Bid (Part-II).	Yes / No / Explain	
16	VSSC reserves the right to provide delivery schedule of spares and consumables at appropriate time.	Yes / No / Explain	
17	List of all spares and consumables required along with their required quantities, for regular operation of the laser system and laser chiller for 5-years at 2500 hours/year, after the warranty period, should be stated in the bid.	Yes / No / Explain	
18	5-year non-comprehensive AMC (after the warranty period) is to be provided for laser system and laser chiller.	Yes / No / Explain	
19	All the details pertaining to the warranty terms and conditions should be detailed in the Techno-Commercial Bid (Part-I).	Yes / No / Explain	
20	The party is required to explain the nature of preventive maintenance and service to be performed periodically for smooth operation of the system.	Yes / No / Explain	

21	Party should explicitly state the terms and conditions of the warranty, and also the nature of maintenance and service work to be carried out by the party during the mentioned period.	Yes / No / Explain	
22	List of spares (including their quantity) that are NOT covered under the warranty period should be separately stated in the Techno-Commercial Bid (Part-I).	Yes / No / Explain	
23	List of spares (including their quantity) covered under the warranty period should be explicitly stated in the Techno-Commercial Bid (Part-I).	Yes / No / Explain	
24	During the warranty period, services and break-down maintenance of the laser system should be attended by the laser OEM representative or OEM-certified and trained technical personnel.	Yes / No / Explain	
25	The warranty includes workmanship, breakdown maintenance visits and replacement of defected subsystems/sub-components/spares in case of system failure at no extra cost (maximum shut down period: less than 30 days).	Yes / No / Explain	
26	A minimum 1-year Warranty should be provided for the laser system, laser chiller, and all other items, from the date of acceptance of the system after commissioning.	Yes / No / Explain	
27	The training should explicitly cover the laser safety aspects. Adequate demonstration and training should be provided for the health monitoring and speedy troubleshooting of the system.	Yes / No / Explain	
28	Training should be provided on the safe handling, operation, maintenance and troubleshooting of the systems/subsystems and also for handling and replacement of components, spares and consumables, whenever required.	Yes / No / Explain	
29	Adequate technical training should be imparted to the scientific/technical personnel nominated by VSSC, at the installation site, for a period of 2 weeks during the installation period, at no extra cost.	Yes / No / Explain	
30	All necessary tools required for replacement of flash-lamp or any other consumables are to be supplied.	Yes / No / Explain	

31	Party shall supply all the essential equipment/tools required for routine operation and safety, post installation.	Yes / No / Explain	
32	All the test reports performed at the manufacturer's end (factory site) and customer's end (installation site) shall be furnished.	Yes / No / Explain	
33	The system shall be accepted only after successful installation/integration of the sub-systems, demonstration and commissioning of the system at the installation site, meeting the required scientific/technical specifications.	Yes / No / Explain	
34	All necessary tools/equipment/accessories required for installation, testing, and commissioning of the laser system and accessories, should be brought by the party.	Yes / No / Explain	
35	The system shall be accepted only after continuous operation (> 10 hours per day) for 3 consecutive days, ensuring satisfactory performance and test results.	Yes / No / Explain	
36	The installation site test results to be provided include average laser power and energy, beam diameter & beam divergence (before and after expansion), beam spatial profile, energy stability, power drift, etc.	Yes / No / Explain	
37	During installation, the party has to mandatorily demonstrate the performance of the laser transmitter system at the installation site.	Yes / No / Explain	
38	The party has to ensure that the vertically transmitted expanded laser beam has a beam dia. of 100 mm, with a divergence < 0.1 mrad.	Yes / No / Explain	
39	The party has to demonstrate vertical transmission of the expanded laser beam into the atmosphere through the roof-top opening available at the installation site.	Yes / No / Explain	
40	The party has to perform the complete installation and operation of the laser system with laser chiller, and integrate the laser with the beam expander and beam steering mirror, forming a complete lidar transmitter system.	Yes / No / Explain	
41	The installation of the laser system should be performed by representatives of the laser OEM, or by trained technical personnel certified by the laser OEM.	Yes / No / Explain	

42	The installation of the system should be completed within 1 month of delivery of items at the installation site.	Yes / No / Explain	
43	Delivery of the system at the installation site should not exceed 6 months from the date of PO.	Yes / No / Explain	
44	The party has to perform complete installation, testing and commissioning of the laser system at the installation site along with chiller and other accessories at the identified installation site at Mahendragiri.	Yes / No / Explain	
45	The party has to deliver all the items to IPRC, Mahendragiri, Tirunelveli district, Tamil Nadu.	Yes / No / Explain	
46	The burn patterns and test results will be reviewed by VSSC. Shipping of the item shall be effected only after the test reports from the manufacturer's end are certified as satisfactory by VSSC.	Yes / No / Explain	
47	VSSC reserves the right to witness the laser tests at the factory site of the party, if required.	Yes / No / Explain	
48	All the factory tests should be carried out after at least four hours of operation of the laser.	Yes / No / Explain	
49	The factory tests shall include burn paper patterns, beam spatial profile, energy stability, energy at 532 nm, power drift, pulse width and other parameters achieved by the developed laser system.	Yes / No / Explain	
50	All test results should be recorded and submitted to VSSC, for evaluation of the system performance.	Yes / No / Explain	
51	The party has to mandatorily perform essential tests of the system at the factory site during the developmental phase.	Yes / No / Explain	
52	The specifications, operation principle, power requirements, spares & consumables, etc. for the laser chiller should be clearly stated in the Techno-Commercial Bid (Part-I), along with the make and model number.	Yes / No / Explain	
53	The laser OEM has to certify that the chiller specifications offered are adequate to meet the thermal management requirements of the offered laser. This certificate should be submitted along with the Techno-Commercial Bid (Part-I).	Yes / No / Explain	

54	Details of the laser cooling system embedded in the laser system, if any, should be explicitly stated in the Techno-Commercial Bid (Part-I). Any further thermal management requirement should be taken care by the offered laser chiller.	Yes / No / Explain	
55	If there are any discrepancies between given specifications and attached documentation, party has to provide satisfactory explanation for the same. All specifications and performance characteristics shall be furnished by the manufacturer.	Yes / No / Explain	
56	The above documents/manuals shall be provided with the Techno-Commercial Bid (Part-I) as well as during the supply of the item after placement of PO.	Yes / No / Explain	
57	The technical documentation shall cover layout diagrams of all sub-systems, and components for systematic fault diagnostic.	Yes / No / Explain	
58	The technical documents should contain operational manuals, detailed technical manuals, service and maintenance manuals, troubleshooting manuals, etc., from the OEM.	Yes / No / Explain	
59	The party should provide technical documents of capital and minor equipment in English language.	Yes / No / Explain	
60	Tests that are to be performed at the installation site should also be outlined in the Techno-Commercial Bid (Part-I).	Yes / No / Explain	
61	Tests to be conducted during the development phase of the laser system at the factory site and the parameters that are to be evaluated should be outlined in the Techno-Commercial Bid (Part-I).	Yes / No / Explain	
62	Schedule breakup and timeline of the system development, supply and installation, should be included in the Techno-Commercial Bid (Part-I).	Yes / No / Explain	
63	Authorised distributor certificate for Indian region, from the OEM/principals, should be included in the Techno-Commercial Bid (Part-I).	Yes / No / Explain	
64	List of deliverables for each of the indented items, in the prescribed forma, should be included in the Techno-Commercial Bid (Part-I).	Yes / No / Explain	
65	Technical parameters related to troubleshooting/self-diagnostics should be clearly stated in the Techno-Commercial Bid (Part-I).	Yes / No / Explain	

66	All necessary laser safety requirements, conditions & precautions should be explicitly detailed in the Techno-Commercial Bid (Part-I).	Yes / No / Explain	
67	All the site readiness requirements at the installation site should be explicitly stated in the Techno-Commercial Bid (Part-I).	Yes / No / Explain	
68	Any expected degradation in the performance of the laser system (energy, pulse duration, etc.) over time shall be explicitly stated in the Techno-Commercial Bid (Part-I).	Yes / No / Explain	
69	The technologies adopted in the laser system for achieving energy stability, beam pointing stability, etc., shall be explained in the Techno-Commercial Bid (Part-I).	Yes / No / Explain	
70	Standard/sample test reports for the offered laser model including energy stability, power drift, beam spatial profile, etc. should be included in the Techno-Commercial Bid (Part-I).	Yes / No / Explain	
71	Procedure and time intervals for replacement of spares and consumables (flashlamps, filters, cartridges, etc.) of the laser system should be outlined in the Techno-Commercial Bid (Part-I), and certified by the laser OEM.	Yes / No / Explain	
72	List of equipment/tools required for routine operation, maintenance and safety, post installation should be included in the Techno-Commercial Bid (Part-I).	Yes / No / Explain	
73	List of spares/consumables, tools and fixtures to be supplied along with the system should be included in the Techno-Commercial Bid (Part-I).	Yes / No / Explain	
74	Make and model number of the offered laser system, laser chiller, power meter, beam expander, and beam steering mirror should be included in the Techno-Commercial Bid (Part-I).	Yes / No / Explain	
75	Adequate test points should be provided in the laser system for health monitoring and speedy trouble shooting. These aspects should be explicitly stated in the maintenance/trouble shooting manual.	Yes / No / Explain	
76	The party has to ensure compliance with all the technical specifications of the high-energy laser system stated in the tender.	Yes / No / Explain	

77	The offered laser should be in production line, and prototype laser units (which do not have any proven track-record in lidar applications) will not be accepted.	Yes / No / Explain	
78	The offered laser should be commercially available, and rugged enough with proven track record for long duration operation (>10 hours daily), operating at 532 nm for lidar application.	Yes / No / Explain	
79	Offers are sought from reputed OEMs having heritage in supply, installation and operation of high-energy laser systems for atmospheric lidar application.	Yes / No / Explain	
80	The indent is for a scientific high-energy laser system for atmospheric lidar application, for vertical profiling of atmosphere from near-surface (~300 m) to ~100 km altitude.	Yes / No / Explain	
81	This is a TWO-PART tender i.e. Techno-Commercial Bid (C1 & C2 of tender document) and Price Bid (C3 of tender document) shall be submitted separately. All technical and commercial terms and conditions shall be furnished in the Techno-Commercial Bid while price shall be indicated only in the Price Bid. Uploading price details anywhere else other than the price-bid shall lead to unconditional rejection of the tender. Please make note of the same. Tenderers are advised NOT TO UPLOAD any documents revealing the price in technical & Commercial bid other than area marked as price related documents	Yes / No / Explain	
82	GST extra as applicable. Please quote applicable G.S.T rates with HSN code. Your GST Reg.No. and details shall be furnished in your quotation	Yes / No / Explain	
83	Delivery Terms : FOR IPRC, Mahendragiri (via IPRC Stores).	Yes / No / Explain	
84	Delivery Period : Schedule/Timeline of the development, realization, testing at factory site, delivery, installation, testing & commissioning of the system at the installation site at IPRC, Mahendragiri, and training, should be clearly stated in the bid. LD shall be applicable in case of delay from stated time line	Yes / No / Explain	

85	Liquidated Damages @ 0.5% per week subject to maximum of 10% of order value is applicable beyond the promised delivery schedule.	Yes / No / Explain	
86	Warranty [Minimum one year required.]	Yes / No / Explain	
87	5-year non-comprehensive AMC (after the warranty period) is to be provided for laser system and laser chiller.	Yes / No / Explain	
88	Performance Bank Guarantee for 3% of order value valid 2 months beyond the Warranty Period to be provided.	Yes / No / Explain	
89	Security Deposit: Successful Tenderer shall submit Security Deposit equivalent to 3% of the order value valid for a period of 60 days beyond the date for completion of the Purchase Order. This security deposit is collected towards the performance of the Contract. The said Security Deposit shall be submitted either in the form of Bank Guarantee or Fixed Deposit receipts from Nationalised/Scheduled Banks. No exemption is applicable for MSE vendors from submission of Security Deposit. In case PSU/Autonomous bodies/Central Government organizations, Indemnity Bond shall be accepted. Wherever SD and PBG are involved, the same can be submitted in consolidated SD cum PBG, valid till completion of warranty obligations under the contract. Necessary formats will be issued to the successful tenderer along with Purchase order.	Yes / No / Explain	
90	GeM Seller Unique ID	Yes / No / Explain	
91	Country of Origin	Yes / No / Explain	
92	PO ordering address in full with Contact Persons Name, E-mail id, Phone No. [also attach your Quotation in PDF format].	Yes / No / Explain	

93	As per the provisions of Office Memorandum No. F. No. 6/18/2019-PPD dtd. 23.07.2020 (i.e., Rule No. 144 (xi) of GFR) and its Amendments, issued by Department of Expenditure, Ministry of Finance. I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; I certify that this bidder is not from such a country or, if from such a country, has been registered with the Competent Authority. I hereby certify that this bidder fulfills all requirements in this regard and is eligible to be considered.	Yes / No / Explain	
94	If any of the bidders submit any forged or false documents along with the Tender, such tenders will be summarily rejected and such bidders will be blacklisted for all future tenders.	Yes / No / Explain	
95	Non Local suppliers shall also be eligible to bid along with Class I local suppliers and class II local suppliers. Class I local supplier is eligible for purchase preference as Govt of India Public Procurement preference Make in India Order 2017 dt 16.09.2020	Yes / No / Explain	
96	Any other terms	Yes / No / Explain	

C.3 Price Bid

Sl. No.	Item	Quantity	Unit Price	Currency	Total Price	Remark
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1	High Power LASER Systems: High-energy Flash-lamp pumped Q-switched Nd:YAG Laser System with frequency doubling, emitting @ 532 nm wavelength including Power Supply and other essential accessories, for Atmospheric Lidar Application	1.00 Sets		-		
2	LASER Accessories: Essential spares (items not covered under warranty) and consumables such as Flashlamps for Oscillator and Amplifiers, Cartridges/Filters etc., for operation of offered Laser System for 5000 hours	1.00 Sets		-		
3	LASER Accessories: Laser Chiller (adequate for the offered Laser System) with accessories	1.00 Sets		-		

4	LASER Accessories: Laser Power and Energy Meter with sensor, display unit and accessories, adequate for the offered Laser System	1.00 Sets		-		
5	LASER Accessories: Laser Beam Expander (adequate for the offered Laser System) with accessories	1.00 Sets		-		
6	LASER Accessories: Laser Beam Steering Mirror (adequate for the offered Laser System) with Mounts and accessories, for steering the laser beam vertically into the atmosphere	1.00 Sets		-		

Common charges (Applicable for all items)

Freight charge	
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