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

System Description / Indented Items*

No.	Description of the Items	Quantity
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	One set
Laser Accessories:		
2	Essential spares (items not covered under warranty) and consumables such as Flashlamps for Oscillator and Amplifiers, Cartridges/Filters etc., for the operation of the offered Laser System for 5000 hours. *[List of items and their quantity should be provided]*.	One set
3	Laser Chiller (adequate for the thermal management of the offered Laser System) with essential accessories and spares	One set
4	Laser Power and Energy Meter with sensor, display unit and accessories, adequate for the offered Laser System	One set
5	Laser Beam Expander (adequate for the offered Laser System) with accessories	One set
6	Laser Beam Steering Mirror (adequate for the offered Laser System) with Mounts and accessories, for steering the laser beam vertically into the atmosphere	One set
Other Requirements:		
7	Installation, Testing and Commissioning	One time
8	Warranty for all the offered items	Minimum 1 year
9	(i) Non-comprehensive AMC (after the warranty period) for the laser system and laser chiller (ii) List & quantity of spares and consumables for operation of the laser system and laser chiller for 5 years at 2500 hours/year during the AMC period.	5 years

*Detailed specifications for all the indented items are given in Tables 1-6

High-Energy Flash-lamp pumped Q-switched Nd:YAG Laser System

Table1: Technical specifications ofHigh-Energy Laser System

No.	Parameter	Specification	Remarks to Party
1	Application	To be used as a laser transmitter of a lidar system for atmospheric profiling	Provide details of specifications including make and model
2	Type of the laser	High-energy, Pulsed, Flash-lamp pumped, Q-switched, solid state laser	Provide details of the offered laser
3	Pulsed Laser Source	Nd:YAG	Provide details
4	Emitting wavelength	532 nm	Provide value
5	Wavelength Separation Package	Suitable Wavelength Separation Package for operating at 532 nm, including the Harmonic Generator	Provide details
6	Average Energy per pulse at 532 nm	≥ 800 mJ	Provide the value for the offered laser
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
8	Pulse Width at 532 nm	5 - 10 ns	Any value within this range is acceptable. Provide the value for the offered laser.
9	Power drift at 532 nm	≤ 6% for 8 hours of operation	Provide the value for the offered laser.
10	Energy Stability at 532 nm	Better than ±4% (shot-to-shot stability)	Provide the value for the offered laser.
11	Beam diameter at 532nm	10 ± 2 mm	Provide the value for the offered laser.
12	Beam divergence (Full angle) at 532nm	≤ 0.5 mrad at full angle for $1/e^2$	Provide the value for the offered laser.
13	Beam pointing stability at 532nm	≤ ±40µrad	Provide the value for the offered laser.
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.
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.
16	Line width at 532 nm	≤ 1cm^{-1} (unseeded)	Provide the value of linewidth in cm^{-1}.

17	Temporal Jitter	± 0.5 ns or better (unseeded)	Provide the value for the offered laser.
18	Warranted Lamp Lifetime	~30 million shots or higher	Provide the value for the offered laser.
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.
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.
21	Dimensions of Laser Head	As compact as possible is preferred	Provide details of dimensions and weight.
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.
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.
24	Laser Accessories	All essential laser accessories such as burn papers, safety goggles, gloves, etc., should be provided	Provide list and quantity of accessories.
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.

Essential Spares & Consumables for operation of Laser System

Table 2: Technical specifications of Essential Spares and Consumables

No.	Parameter	Specification/Quantity	Remarks to Party
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.*
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.*
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.*
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.*
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.*

Laser Chiller with Accessories

Table 3: Technical specifications of Laser Chiller

No.	Parameter	Specification	Remarks to Party
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.
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.
3	Water flow and pressure for cooling	Specification suitable for the offered high-power laser system	Provide value
4	Cooling capacity	Minimum 5 TR	Provide value
5	Storage tank capacity	Minimum 50 L	Provide value (direct tap water connection will not be provided, hence storage tank is required)
6	Set temperature window	Specification suitable for the offered high-power laser system	Provide values
7	Accessories	All essential accessories required for the standalone chiller should be provided	Provide details
8	Power requirement	Suitable to Indian power conditions	Provide values
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
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.	*Provide the heat dissipation value (in kW) of the offered laser.*

Laser Power and Energy Meter with sensor, display unit and accessories

Table 4: Technical specifications of Laser Power and Energy Meter

No.	Parameter	Specification	Remarks to Party
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
2	Spectral Range	0.3 to 1.1 µm or wider	Provide value
3	Sensor Aperture	≥ 20 mm	Provide value
4	Power Range	200 mW to 200 W or wider	Provide value
5	Power Accuracy	±3% or better	Provide value
6	Energy Range	50 mJ to 5 J or wider	Provide value
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
8	Display	Appropriate digital display of power, energy, pulse rate and their statistics including energy and power stability	Provide details
9	PC Interface	USB-enabled; suitable software to be provided	Provide details
10	Accessories	All suitable cables, connectors, and batteries	Provide details

Laser Beam Expander with Accessories

Table 5: Technical specifications of Laser Beam Expander

No.	Parameter	Specification	Remarks to Party
1	Application	For expanding the beam emanating from the laser head, in order to reduce the divergence	Provide details including make and model
2	Design Wavelength (DWL)	532 nm	Provide value
3	Input clear aperture	≥ 12 mm	About 2 mm greater than the input laser beam diameter of about ~10 mm
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
5	Output beam divergence	< 0.1 milli-radians Adequate expansion factor (X) is required to reduce the beam divergence	Provide value of output beam divergence achievable and the expansion factor
6	Substrate	Suitable material for High-energy pulsed lasers (> 800 mJ energy per pulse at 532 nm)	Provide details
7	Laser-Induced Damage Threshold (LIDT)	≥ 4.5 J/cm^2 at 532 nm, ~10 ns pulse width, ~30 Hz PRF	Provide LIDT value and coating details
8	Angle of Incidence	0 deg	Provide value
9	Transmission	≥ 95%	Provide value
10	Transmitter Wavefront Error	P-V: λ/10 or better for ~10 mm input laser beam diameter	Provide value
11	Mount	Suitable mount at the laser beam height is to be provided. Mount requirements are: ○ Beam expander has to be precisely aligned with the laser beam emanating from the laser head. ○ Mounting height is to be determined as per height of the laser beam from table top for the offered laser system. ○ Provision for fine adjustment/translation of the beam expander is preferable (height and position adjustment)	Provide details of the mount

Laser Beam Steering Mirror with Mounts and accessories

Table 6: Technical specifications of Beam Steering Mirror and accessories

No.	Parameter	Specification	Remarks to Party
1	Application	Reflecting Mirror for transmitting the expanded laser beam vertically into the atmosphere	Provide details including make and model
2	Design Wavelength (DWL)	532 nm	Provide details
3	Mirror Diameter	~200 mm (about 2 times expanded beam diameter)	Provide value
4	Substrate	Suitable material for High-energy pulsed lasers (> 800 mJ energy per pulse at 532 nm)	Provide details
5	Reflectance	≥ 99 % at 532 nm	Provide specification value offered. Provide details of mirror coatings
6	Surface Finish	P-V: λ/10 or better	Provide value
7	Angle of Incidence	45 degrees	Provide value
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
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° or better; Fine resolution: 0.005° or better; Digital readout is preferred	Provide the elevation range and azimuth range, and their adjustment resolutions, including other specifications
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°or better; Fine resolution: 0.005°or better; Digital readout is preferred	Provide the mount specifications and adjustment resolutions

Requirements and General Terms & Conditions

1. 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.
2. Offers are sought from reputed OEMs having heritage in supply, installation and operation of high-energy laser systems for atmospheric lidar application.
3. 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.
4. 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.
5. The party has to ensure compliance with all the technical specifications of the high-energy laser system stated in the tender.
6. 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.
7. **The Techno-Commercial Bid (Part-I) should contain the following:**
   (i) Make and model number of the offered laser system, laser chiller, power meter, beam expander, and beam steering mirror.
   (ii) List of spares/consumables, tools and fixtures to be supplied along with the system
   (iii) List of equipment/tools required for routine operation, maintenance and safety, post installation
   (iv) Procedure and time intervals for replacement of spares and consumables (flashlamps, filters, cartridges, etc.) of the laser system should be outlined, and certified by the laser OEM.
   (v) Standard/sample test reports for the offered laser model including energy stability, power drift, beam spatial profile, etc.
   (vi) The technologies adopted in the laser system for achieving energy stability, beam pointing stability, etc., shall be explained.
   (vii) Any expected degradation in the performance of the laser system (energy, pulse duration, etc.) over time shall be explicitly stated.
   (viii) All the site readiness requirements at the installation site should be explicitly stated.
   (ix) All necessary laser safety requirements, conditions & precautions should be explicitly detailed.
   (x) Technical parameters related to troubleshooting/self-diagnostics should be clearly stated.
   (xi) List of deliverables for each of the indented items, in the prescribed format given in Table-7.
   (xii) Authorised distributor certificate for Indian region, from the OEM/principals.
   (xiii) Schedule breakup and timeline of the system development, supply and installation
   (xiv) 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. Tests that are to be performed at the installation site should also be outlined.
8. **Technical Documents / Operational Manuals:**
   (i) The party should provide technical documents of capital and minor equipment in English language. The technical documents should contain operational manuals, detailed technical manuals, service and maintenance manuals, troubleshooting manuals, etc., from the OEM. The

documentation shall cover layout diagrams of all sub-systems, and components for systematic fault diagnostic.

(ii) 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.

(iii) 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.

9. **Laser Chiller for thermal management:**

(i) 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.

(ii) The party has to obtain certificate from the laser OEM that the chiller specifications offered in the bid 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).

(iii) 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.

10. **Test and Evaluation of the System at the Factory Site:**

(i) The party has to mandatorily perform essential tests of the system at the factory site during the developmental phase. All test results should be recorded and submitted to VSSC, for evaluation of the system performance.

(ii) The 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.

(iii) All the tests should be carried out after at least four hours of operation of the laser.

(iv) VSSC reserves the right to witness the laser tests at the factory site of the party, if required.

(v) 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.

11. **Supply, Installation, Testing and Commissioning at the Installation Site:**

(i) The party has to deliver all the items to IPRC, Mahendragiri, Tirunelveli district, Tamil Nadu, and perform complete installation, testing and commissioning of the laser system along with chiller and other accessories at the identified installation site at Mahendragiri.

(ii) Delivery of the system at the installation site should not exceed **6 months** from the date of PO.

(iii) The installation of the system should be completed within **1 month** of delivery of items at the installation site.

(iv) 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.

(v) 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, vertically transmitting the expanded laser beam into the atmosphere through the roof-top opening available at the installation site. 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.

(vi) During the installation, the party has to mandatorily demonstrate the performance of the laser transmitter system at the installation site, and provide test results including, average laser power and energy, beam diameter & beam divergence (before and after expansion), beam spatial profile, energy stability, power drift, etc. The system shall be accepted only after

continuous operation (> 10 hours per day) for 3 consecutive days, ensuring satisfactory performance and test results. All necessary tools/equipment/accessories required for installation, testing & commissioning of the complete system, should be brought by the party.

(vii) 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. All the test reports performed at the manufacturer's end (factory site) and customer's end (installation site) shall be furnished.

(viii) Party shall supply all the essential equipment/tools required for routine operation and safety, post installation. All necessary tools required for replacement of flash-lamp or any other consumables are to be supplied.

12. **Training:** 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. 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 (including flashlamps and cartridges/filters), whenever required. 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.

13. **Warranty:** 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.

    (i) 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)*

    (ii) 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.

    (iii) List of spares (including their quantity) covered under the warranty period should be explicitly stated in the Techno-Commercial Bid (Part-I).

    (iv) 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).

    (v) 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.

    (vi) The party is required to explain the nature of preventive maintenance and service to be performed periodically for smooth operation of the system.

    All the details pertaining to the warranty terms and conditions should be detailed in the Techno-Commercial Bid (Part-I).

14. **Non-comprehensive AMC:**

    (i) 5-year non-comprehensive AMC (after the warranty period) for laser system and laser chiller.

    (ii) 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 Techno-Commercial Bid (Part-I). VSSC reserves the right to provide delivery schedule at appropriate time.

    (iii) 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), in the format prescribed in Table-8.

    (iv) Cost of non-comprehensive AMC will also be considered for the evaluation of price bids.

15. **Major Milestones:** 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 for identified VSSC personnel, should be clearly stated in the Techno-Commercial Bid (Part-I).
16. 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.
17. 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.
18. 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.

Commercial Terms and conditions

1. **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.
2. **Security Deposit (SD) & Performance Bank Guarantee (PBG)**: SD & PBG can be in the form of Bank Guarantee, DD, FDR etc. 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.
3. **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).
4. **Payment Terms:** Payment terms for supply and payment terms for installation, testing, and commissioning of the system should be indicated separately.
5. **Authorization from OEM/Principal & Licence:** 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). The licence and authorization should be valid for an extended period, at least up to the end of warranty period.
6. **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.
7. **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).
8. Note: All the above details should be provided in the Techno-Commercial Bid (Part-I).
9. **Bid Evaluation Criteria:** Bid evaluation criteria include the cost of non-comprehensive AMC also.

Prescribed format for List of Deliverables

To be submitted along with Techno-Commercial Bid (Part-I)

The party should provide the details of deliverables for each of the indented items in the Techno-Commercial Bid (Part-I), as given in the prescribed format in Table-7.

Table-7

Sl. No.	Description & Specification	List of Deliverables
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	[List of items and quantity to be supplied along with the system]
2	Essential spares (items not covered under warranty) and consumables such as Flashlamps for Oscillator and Amplifiers, Cartridges/Filters etc., for the operation of the offered Laser System for 5000 hours.	[List of items and quantity to be provided]
3	Laser Chiller (adequate for the thermal management of the offered Laser System) with accessories	[List of items and quantity to be provided]
4	Laser Power and Energy Meter with sensor, display unit and accessories, adequate for the offered Laser System	[List of items and quantity to be provided]
5	Laser Beam Expander (adequate for the offered Laser System) with accessories	[List of items and quantity to be provided]
6	Laser Beam Steering Mirror (adequate for the offered Laser System) with Mounts and accessories, for steering the laser beam vertically into the atmosphere	[List of items and quantity to be provided]
7	Installation, Testing and Commissioning	[List of tools/materials required for installation and testing to be provided]
8	**Warranty:** (i) List of spares (including their quantity) covered under the warranty period for all the items. (ii) List of spares (including their quantity) that are NOT covered under the warranty period for all the items.	[List of items and quantity to be provided] [List of items and quantity to be provided]
9	**5-year Non-comprehensive AMC:** List of spares and consumables for operation of the **laser system and laser chiller** for 5 years at 2500 hours/year, during the non-comprehensive AMC period	[List of items and quantity to be provided]

* The above table is to duly filled and submitted along with Techno-Commercial Bid (Part-I). Price information should NOT be provided in this table.

Prescribed format for submitting Price Bid (Part-II)

The party should provide the split-up price of the items/subsystems and the total cost in the Price Bid (Part-II), as given in the prescribed format in Table-8.

Table-8

No.	Particulars	Quantity	Price
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	One set	
2	Essential spares (items not covered under warranty) and consumables such as Flashlamps for Oscillator and Amplifiers, Cartridges/Filters etc., for the operation of the offered Laser System for 5000 hours *[List of items, quantity and cost should be provided].*	One set	
3	Laser Chiller (adequate for the thermal management of the offered Laser System) with accessories	One set	
4	Laser Power and Energy Meter with sensor, display unit and accessories, adequate for the offered Laser System	One set	
5	Laser Beam Expander (adequate for the offered Laser System) with accessories	One set	
6	Laser Beam Steering Mirror (adequate for the offered Laser System) with Mounts and accessories, for steering the laser beam vertically into the atmosphere	One set	
7	Installation, Testing and Commissioning	One time	
	Total Cost (Aggregate of Sl. No.1-7.)		

No.	Particulars	Price
8	Freight (From _____ to _____)	
9	GST applicable	
10	Any other taxes (if any)	

No.	Particulars	Price
11	**5-year non-comprehensive AMC** for laser system and laser chiller, after the warranty period *(Breakdown visit and maintenance within 30 days)*	
12	Essential spares and consumables (item-wise) for the operation of the **laser system** for 5 years at 2500 hours/year, during the non-comprehensive AMC period. List of items, quantity and cost should be provided.	
13	Essential spares and consumables (item-wise) for the operation of **laser chiller** for 5 years at 2500 hours/year, during the non-comprehensive AMC period. List of items, quantity and cost should be provided.	

* The above table is to duly filled and submitted along with Price Bid (Part-II). This table with price information should NOT be included in the Techno-Commercial Bid (Part-I).