भारत सरकार/GOVERNMENT OF INDIA अंतरिक्ष विभाग/DEPARTMENT OF SPACE

विक्रम साराभाई अंतरिक्ष केंद्र/VIKRAM SARABHAI SPACE CENTRE

तिरुवनंतपुरम/THIRUVANANTHAPURAM - 695 022

विज्ञा .सं .वीएसएससी/पी/विज्ञा/.एमएमई/47/2025 दि.15/09/2025 ADVT. NO. VSSC/P/ADVT/MME/47/2025 DT. 15/09/2025

विक्रम साराभाई अंतरिक्ष केंद्र (वीएसएससी), भारत सरकार सिरेमिकी के लिए 3डी प्रिन्टर की स्थापना हेतु देश के अंदर के इच्छुक प्रतिष्ठानों से अभिरुचि की अभिव्यक्ति आमंत्रित करता है।

Vikram Sarabhai Space Centre [VSSC], Govt. of India invites Expression of Interest from interested firms within the country for Establishing a 3D printer for Ceramics.

विस्तृत तकनीकी विनिर्देशन तथा एवं शर्तें हमारे वेबसाइट <u>www.isro.gov.in</u>और <u>www.vssc.gov.in</u>पर उपलब्ध हैं।

Detailed Technical Specification and Terms & Conditions are available in our website $\underline{www.isro.gov.in}$ and $\underline{www.vssc.gov.in}$.

इच्छुक प्रत्याशी निर्माता हमारे संदर्भ सं .6084 2025 00 1968 01 का उल्लेख करते हुए <u>दिनांक</u> 16/10/2025 को 2 बजे अपराह्न या उससे पहले निम्नलिखित पते पर अपनी अभिरुचि की अभिव्यक्ति प्रस्तुत कर सकते हैं।

Interested prospective Manufacturers can furnish their Expression of Interest quoting our reference No. <u>6084 2025 00 1968 01 on or before 16/10/2025</u>; <u>Time: 2pm</u> to the following address.

वरि .क्रय एवं भंडार अधिकारी
Sr. Purchase & Stores Officer
क्रय यूनिट ,एमएमई क्रय,
Purchase Unit V, MME Purchase,
आरएफएफ क्षेत्र ,इसरो पोस्ट- 695 022
RFF Area, ISRO Post - 695 022
तिरुवनंतपुरम/Thiruvananthapuram

DOCUMENT INVITING EXPRESSION OF INTEREST (EOI) FOR ESTABLISHING A 3D PRINTER FOR CERAMICS



GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

VIKRAM SARABHAI SPACE CENTRE

THIRUVANANTHAPURAM – 695 022

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DEFINITIONS

"Expression of Interest" The document/response submitted by the Respondent based on

this document.

"VSSC" Vikram Sarabhai Space Centre (VSSC), ISRO,

Thiruvananthapuram, represented by Sr. Head, Purchase & Stores Division (P&SD), VSSC, acting on behalf of the President

of India.

"Respondent" The Supplier/OEM/Vendor/Party, when participating in the

Expression of Interest (EoI) process.

"Bidder" The Respondent 'screened in' during the evaluation process of

the Expression of Interest (EOI) and participated in the Request

for Proposal (RFP) process.

"Request for Proposal"

Document issued to shortlisted Respondents, detailing out the

entire scope of work, responsibilities of the Service Provider and VSSC, resource requirements, list of deliverables and activities to be carried out, timelines, costing formats, commercial terms

and conditions, including payment terms

"Service Provider/Supplier"

The successful Bidder chosen by the VSSC, responsible &

forexecuting the works under the Contract.

"Contract" The formal agreement that is signed by VSSC and the Service

Provider for the execution of work or a Purchase Order (PO)

released by VSSC.

"3D printing" Additive manufacturing

1. Introduction

This Expression of Interest (EOI) is issued by Vikram Sarabhai Space Centre (VSSC), ISRO, eligible Thiruvananthapuram, inviting proposals from and experienced organisations/companies/firms/partners for the establishment of a versatile, entry-level Ceramic 3D Printer at VSSC for performing prototyping, limited scale production, research and development (R&D) activities exploring near-net shaping of different advanced ceramic parts of different chemistry and complex geometry offering high productivity & yield and repeatability. A ceramic 3D printer for additive manufacturing of various technical ceramics namely (Al₂O₃, ZrO₂, custom ceramics) is proposed to be established through this EOI and subsequent Request for Proposal (RFP). Interested 'Respondents' of EoI will be evaluated for Technical appropriateness and short-listed as 'Bidders' for 'Request for Proposal (RFP).' The 'Supplier/ Service Provider' will be selected from the 'Bidders.'

2. Indented use of the Facility

The ceramic 3D printer proposed to be realised through this EOI and subsequent RFP shall be established for the limited-scale production of a range of ceramic parts and fabrication of ceramic parts for R&D studies, ceramic prototype manufacturing and realisation of ceramics for mission requirements.

3. Objective

It is proposed to establish a ceramic 3D printing facility for additive manufacturing of ceramic parts with fine features/details, finish and dimension accuracy. The facility shall be employed for prototyping, limited-scale production, research & development.

4. Scope of work

4.1. Scope of VSSC

- 4.1.1. Ensuring the site's readiness as per the layout that is mutually agreed upon.
- 4.1.2. Executing minor civil and electrical work essential for installing and housing the VSSC facility.
- 4.1.3. Provide the necessary workforce for supporting installation, commissioning and technology demonstration activities.
- 4.1.4. Supply ceramic powders for special requirement printing with the required particle size and morphology for slurry formulation.

4.1.5. Procure and provide all necessary raw materials (ceramics, binder, plasticizers, dispersants/ deflocculants, additives, organic solvents etc.) to support the in-house preparation and processing of ceramic slurry.

4.2. Scope of Bidder/Supplier / Service Provider

The selected Supplier shall be responsible for the following activities, which together constitute a comprehensive turnkey solution for ceramic 3D printing using near-net shaping technology

- 4.2.1. Design, engineer, fabricate, supply, install, commission and demonstrate a fully functional ceramic 3D printer employing a suitable near-net shaping additive manufacturing technology.
- 4.2.2. Develop and supply ceramic slurry/feedstock formulations optimized for the proposed printing system.
- 4.2.3. Provide an integrated post-processing solution, including debinding, sintering and other necessary steps. This includes process parameter optimization for printing, curing, debinding and sintering stages.
- 4.2.4. Supply a cleaning station equipped with airbrushes and compressed air pressure connections, along with other essential tools required for: Cleaning printed parts
 - Cleaning the build area and equipment before switching between different ceramic slurries.
- 4.2.5. Provide necessary accessories required for pre-processing and post-printing activities.
- 4.2.6. Supply debinding and sintering furnaces appropriate for post-processing of 3D-printed ceramic components.
- 4.2.7. Supply all critical spare parts and essential tools to ensure at least three years of trouble-free operation and maintenance of the complete system.
- 4.2.8. Supply ready-to-print ceramic slurries in the following quantities for material evaluation and validation:

Alumina (>99.5% purity): 5 kg

Partially stabilized Zirconia: 3 kg

Fully stabilized Zirconia: 3 kg

Silicon Nitride (Si₃N₄): 3 kg

• Three additional ceramic slurries of interest to VSSC: 3 kg each

- 4.2.9. Supply equipment and accessories required for in-house processing and formulation of ceramic feed-stocks, including mixing, de-airing and storage.
- 4.2.10. Supply of all technology-specific additives including: (These should be sufficient for the realization of at least 20 kg of finished ceramic components)
 - Organic Solvents
 - Organic binders/plasticizers
 - Photo-sensitive polymeric curing agents
 - Dispersants
- 4.2.11. Provide technical support and consultancy services to VSSC, for a minimum period of three years from the date of commissioning, for the development of custom ceramic slurries.
- 4.2.12. Collaborate with VSSC to develop ceramic-polymer slurry formulations of strategic interest.
- 4.2.13. Supply a comprehensive technology document detailing the 3D printing process, including hardware specifications, printing parameters, and operational guidelines.
- 4.2.14. Supply a detailed technical document outlining procedures and best practices for ceramic slurry preparation and handling.
- 4.2.15. Provide full technical support for troubleshooting during both minor and major equipment breakdowns, ensuring minimal downtime.
- 4.2.16. Enter into a comprehensive Annual Maintenance Contract (AMC) for a period of five years, ensuring reliable, trouble-free operation of the complete system and its subsystems.

5. Comparison of technology

The response from the respondents should compare the existing technologies in the market for 3D printing of ceramic and present the relative advantage of the technology chosen/ proposed/offered by VSSC. This comparison should include the following technologies, and the merits and demerits of the offered technology have to be clearly spelled out.

- Material Extrusion-based technologies, namely (Fused Deposition Modelling, FDM/Fused Filament Fabrication (FFF))
- Stereolithography (SLA)/ Digital Light Processing (DLP)
- Selective Laser Sintering (SLS)

- Selective Laser Ablation (SLA)
- Laminated Object Manufacturing (LOM)
- Inkjet Printing
- Binder Jetting
- Nano Particle jetting (NPJ)

6. Technical Information Submission Guidelines

The respondent shall provide all necessary and detailed technical specifications pertaining to each element of the proposed facility in the structured format outlined below. These details are essential for a comprehensive technical evaluation and comparative analysis.

6.1. Technology Details

- 6.1.1. Description of the 3D Printing/Additive Manufacturing technology adopted for ceramics.
- 6.1.2. Comparative advantages over conventional and competing technologies
- 6.1.3. Details of the scalability of the technology and limitations if any on using similar slurry and printing technology.

6.2. Facility Layout and Core Capabilities

- 6.2.1. Rough layout/sketch showing the positioning of key facility components.
- 6.2.2. Printing resolution (X, Y, Z axes).
- 6.2.3. Minimum achievable feature size after firing/sintering.
- 6.2.4. Layer thickness: specify both minimum and maximum.
- 6.2.5. Build volume (dimensions in X, Y, Z or in litres).
- 6.2.6. Number of VATs (if VAT polymerization is employed).
- 6.2.7. Number of feedstock loading/feeding systems.
- 6.2.8. Feedstock material capacity (per batch or tank).

6.3. Software and Control

- 6.3.1. Software used for design-to-print and part optimization.
- 6.3.2. Capability for modifying process parameters.
- 6.3.3. Calibration methods for job/platform movement.
- 6.3.4. Calibration of laser/light source movement, if applicable.
- 6.3.5. Supported import/export file formats.
- 6.3.6. Auto-tuning capabilities (e.g., position, speed, process feedback).

- 6.3.7. Layer-dependent parameter management.
- 6.3.8. Data formats supported (e.g., STL, OBJ, AMF).
- 6.3.9. Printing/building speed.
- 6.3.10. Maximum allowable continuous operation duration.
- 6.3.11. Erroneous and unsafe parameters blocking

6.4. Operational and Handling Requirements

- 6.4.1. Cleaning requirements during feedstock switching (slurry/filament/powder).
- 6.4.2. External dimensions (L \times W \times H) of the printer and related systems.
- 6.4.3. Weight of printer and associated subsystems.
- 6.4.4. Pre-processing steps:
 - o Build volume cleaning
 - Substrate/VAT/base plate cleaning
 - Feedstock loading
 - Heating or baking prior to printing (if required)
- 6.4.5. Curing requirements (if applicable).

6.5. Post-Processing Equipment

6.5.1. Curing / Debinding Unit

- Usable volume (in litres)
- Exhaust specifications
- Heating System type
- Insulation details
- Power rating (in kW)
- Supply voltage (Voltage, Phases, Frequency)
- Power control system details
- o Maximum operating temperature
- Temperature uniformity
- o Temperature, Flow, Gas Sensors and other controller details

6.5.2. Sintering Unit

- o Usable volume (in litres).
- Heating system type
- Insulation details
- Power rating (in kW)
- Supply voltage (Voltage, Phases, Frequency)
- o Power control system details
- Maximum operating temperature
- Temperature uniformity
- o Temperature, Flow, Gas Sensors and other controller details

6.6. Material Specifications and Output

For the following ceramics, specify:

SI.	Achievable	Surface	Fracture	Chrinkaga	Dimensional
No. Material	Density	Roughness	Toughness	Shrinkage (%)	Accuracy / Min
	(g/cm³)	Rougilless	(MPa√m)	(70)	Feature Size

1. Alumina

(>99.5%)

2. Zirconia

(>99.5%)

6.7. Consumables and Feedstock Materials

- 6.7.1. Complete list of consumables with part numbers
- 6.7.2. Ceramic formulations compatible with the printer
- 6.7.3. Organic solvents
- 6.7.4. Binders/ plasticizers
- 6.7.5. Photo-sensitive additives
- 6.7.6. Dispersants/ Deflocculants
- 6.7.7. Other essential consumables for in-house ceramic feedstock preparation.

6.8. Site Preparation and Utilities

The supplier shall submit detailed pre-installation requirements upon completion of engineering design. These shall include:

- 6.8.1. Floor layout and space requirements.
- 6.8.2. Utility needs:
 - Electrical (Voltage, Phases, Frequency)
 - Water supply
 - Air-conditioning
 - Exhaust/ventilation systems
 - Compressed air supply
 - Clean-room standards (if applicable)
 - o Environmental conditions (humidity, temperature, air quality)
- 6.8.3. The facility shall be operable under either:
 - Single-phase 230 V \pm 10%, 50 Hz \pm 2% (3-wire), or
 - Three-phase 415 V \pm 10%, 50 Hz \pm 2% (4-wire) power systems.

6.9. Safety and Control System

- 6.9.1. The control system shall incorporate a visualization interface for real-time monitoring and control of all critical operations.
- 6.9.2. Software must be intuitive, user-friendly, and support parameter customization.
- 6.9.3. Safety features including interlocks, emergency stops, and alarms must be integral to the system.
- 6.9.4. PC, data acquisition system, and control software shall be supplied as standard.

6.10. Ancillary Requirements

- 6.10.1. Storage cabinet (~500 litres) for ceramic slurries, designed for extended shelf life and controlled environment.
- 6.10.2. Quotation for 5-year supply of spares, consumables, and accessories.

6.11. Documentation and Support

- 6.11.1. Comprehensive User Manual in English, covering standard operating procedures and maintenance protocols.
- 6.11.2. Maintenance and troubleshooting manuals.
- 6.11.3. Provision for remote access for diagnostics and support.
- 6.11.4. Supplier shall extend technical support to VSSC for developing ceramic slurries using in-house ceramic powders.
- 6.11.5. Equipment shall be programmable and flexible, with training provided for programming and operations.

6.12. Environmental Compliance

- 6.12.1. The complete process line shall comply with national environmental emission norms.
- 6.12.2. Special care must be taken in selecting binders and solvents to ensure safe handling, minimal emissions, and regulatory compliance.

7. Technical Questionnaire for Evaluation

All respondents are required to provide comprehensive and technically detailed responses to the following queries. These responses form a critical component of the evaluation process and will directly influence VSSC's decision in the short-listing and selection of potential suppliers, vendors, service providers, or technology partners.

- 7.1. Provide a comparative analysis of the proposed technology with those offered by leading players in the ceramic 3D printing domain (e.g., Admatec, AGC Ceramics/Voxeljet, Concr3de, 3D Ceram Sinto, Formlabs, Lithoz, Prodways, XJet, etc.).
- 7.2. Will any post-processing or machining be required after firing/sintering? If yes, please elaborate on the nature and extent of the machining operations.
- 7.3. Specify the typical time required for refilling or replacing the ceramic feedstock.
- 7.4. Is the build platform/tray size adjustable to enable the printing of small components efficiently?
- 7.5. Is the build platform/tray removable? Please provide operational details.
- 7.6. Does the printer support simultaneous printing of the part and the support structure?
- 7.7. What is the minimum switchover time required between two different print jobs?

- 7.8. Provide the composition of the optimum feedstock formulation (binder, ceramic material, and solvent content).
- 7.9. Is the supplier willing and capable of completing the full scope of work outlined in Section 4.2 of the EoI?
- 7.10. If the response to 7.9 is 'No', please justify and detail how the supplier proposes to meet VSSC's requirements through alternate means.
- 7.11. Does the proposed technology support the processing of thin ceramic substrates?
- 7.12. If 'Yes' to 7.11, specify the minimum thickness achievable without warping or structural deformation.
- 7.13. For VAT polymerization-based technologies, specify the laser/light spot size used in the system.
- 7.14. For VAT polymerization-based technologies, indicate the wavelength and energy output of the light source employed.
- 7.15. Explain the occurrence and mitigation of the voxel effect in the proposed technology.
- 7.16. Describe the supply form of the ceramic feedstock material (e.g., slurry, filament, paste, granules).
- 7.17. Indicate whether the offered technology follows a Top-Down or Bottom-Up printing approach. Provide a technical explanation.
- 7.18. Are there any moving parts within the printer that come in direct contact with or disturb the build volume? If yes, explain the mechanism and control.
- 7.19. What is the recommended shelf life of the feedstock material?
- 7.20. State the optimal storage conditions for the feedstock material.
- 7.21. Provide the average volume, weight, or size of the feedstock batch typically required for standard operations.
- 7.22. Indicate the typical cost of the feedstock material per unit (volume/weight).
- 7.23. Does the system support printing with user-developed materials or VSSC-specific ceramic formulations?
- 7.24. Is the supplier willing to collaborate in developing custom feedstock formulations specifically for ISRO applications? If yes, describe the process and expected timeline.
- 7.25. What technical support can the supplier offer to VSSC in the in-house development of ceramic feedstock?
- 7.26. Is the supplier willing to take full responsibility for setting up the feedstock preparation and processing facility at VSSC?

- 7.27. If the answer to 7.26 is 'No', will the supplier share detailed technical specifications of the required infrastructure for feedstock processing?
- 7.28. Will the supplier provide thermal post-processing guidelines tailored to the supplied feedstock?
- 7.29. Summarize the supplier's experience in additive manufacturing or 3D printing of advanced/technical ceramics.
- 7.30. List global installations of the proposed technology. Include location, client name (where permitted), year of installation, and application domain.
- 7.31. Submit technical documentation and literature demonstrating successful 3D printing of parts using the proposed printer.
- 7.32. Provide a comprehensive list of essential and recommended spare parts.
- 7.33. Provide a list of regular consumables required for the printer's operation.
- 7.34. Furnish customer references, including contact details, for verification and feedback purposes.

8. Pre-delivery inspection

Upon Order Placement and item readiness, the Supplier shall call for the facility's Pre-Delivery Inspection (PDI).

Before dispatch, the supplier shall facilitate a Pre-Delivery Inspection (PDI) of the Ceramic 3D Printer and all associated equipment. The inspection shall be carried out by a designated technical team from the VSSC's side at the vendor's premises. The purpose of the PDI is to verify compliance with technical specifications, performance benchmarks, functional integrity, and quality of the materials. The supplier shall:

- Provide all necessary facilities, tools, consumables, and personnel support for the inspection.
- Share all relevant documentation, including test reports, calibration certificates, quality assurance records, and acceptance protocols.
- Address any deficiencies observed during inspection before final dispatch.
- Bear the cost of the inspection, excluding travel and accommodation of the inspection team (unless otherwise agreed).

Only after successful completion of PDI and formal approval from the purchaser, the equipment shall be packed and shipped.

9. Packing & forwarding

The supplier shall be solely responsible for safely packing and forwarding the Ceramic 3D Printer and all accessories to ensure damage-free transit. Packing must be suitable for:

- Long-distance transportation by road/air/sea.
- Handling by forklift/crane at loading and unloading points.
- Protection against environmental elements, including moisture, dust, and vibration.

All items must be clearly labelled and tagged with identification numbers and content details. A comprehensive packing list shall be enclosed. The cost of packing and forwarding must be included in the commercial offer.

10. Delivery

The supplier shall ensure delivery of the Ceramic 3D Printer and all associated components to the designated site within 16 weeks from the date of issuance of the formal Purchase Order, unless otherwise mutually agreed upon.

Key delivery conditions include:

- The equipment shall be delivered to VSSC in good operational condition.
- Delivery shall include all related accessories, control software, utilities, and documentation (user manuals, warranty cards, installation guides, etc.).
- The suppliershall bear full responsibility for the safe and insured transportation of the goods until final unloading at the site.
- A detailed delivery note and packing list shall accompany the consignment.

Any delay in delivery beyond the agreed timeline, not attributable to force majeure, shall attract penalties as per the terms mutually agreed upon in the final contract.

11. Installation & Commissioning

The supplier shall complete installation and commissioning of the Ceramic 3D Printer at the designated site as specified by VSSC within 4-6 weeks from the date of receipt of the item at VSSC or from the date of issue of the official call by VSSC. Responsibilities of the Respondents include:

- Unpacking, site placement, and assembly of all system components.
- Electrical, pneumatic, and software integration as per OEM standards.

- System calibration, alignment, and validation tests.
- Demonstration of all operating modes and printing capabilities.
- Basic operator training on safety, operations, and maintenance.
- Submission of installation & commissioning report jointly signed by vendor and purchaser's representative.

The supplier shall ensure the availability of qualified technical personnel at the site during this phase. The vendor shall arrange any tools, consumables, or minor fittings required for successful commissioning. The commissioning shall be deemed complete only after successful trial runs and formal acceptance by the purchaser.

12. Technology demonstration and training

- 12.1. The supplier shall provide comprehensive on-site training to the VSSC's personnel upon successfully installing and commissioning the Ceramic 3D Printer. The training shall include:
- 12.2. Operational Training: Startup, parameter setting, part printing, and shutdown procedures.
- 12.3. Software Training: Operation of slicing software, design import, print job management, and post-processing workflows.
- 12.4. Maintenance Training: Routine maintenance, calibration, troubleshooting of common errors, and safety practices.
- 12.5. Material Handling: Safe preparation and usage of ceramic slurries or powders, and waste management protocols.
- 12.6. Training shall be conducted by OEM-certified experts or engineers and should be documented with training manuals and user guides. A training completion certificate shall be issued upon conclusion. No separate cost shall be charged for this training.
- 12.7. As a part of the acceptance of the facility supplied, a technology & capability demonstration exercise shall be performed in high-purity alumina ceramic. Wherein supplier shall demonstrate the following process steps and features
 - CAD designing
 - 3D printing
 - De-binding
 - Sintering
- 12.8. Dimensions, Density, and Homogeneity of the finished part shall be inspected as part of the qualification and acceptance of the facility.

- 12.9. The supplier shall provide Proper training on CAD design, 3D printing of Parts, debinding, and the Sintering process.
- 12.10. The supplier shall train the VSSC personnel to formulate ceramic slurry for the ceramic powders processed at VSSC. Hence, the supplier should agree to co-create a ceramic slurry formulation required for the specific application.
- 12.11. The response to this EOI shall include the timeline required for completing the following activities:

S.No.	Activity	Timeline in Man-days
a)	Installation at VSSC	
b)	Start-up/Commissioning of the facility	
c)	Acceptance test and technological service/Training	

13. Spares

The supplier shall agree to supply a list of recommended essential spares and consumables required for the first 3 years of trouble-free operation. Response to this EOI should include all essential spares, their part numbers, including the following:

- Essential tool set required for regular operation and maintenance
- Spare LightSource, if any
- Spare heating, if any
- Spare Nozzle, if any
- Ceramic slurry handling components & parts.
- Electrical fuses and other electrical spares.
- O-rings, gaskets, seals, or specialty tools, if any.
- OEM part codes and lead times for supply.

The supplier shall ensure the timely availability of spares for a minimum of 10years from the date of commissioning. The non-availability of critical spares within the committed lead time may attract penalties or impact service-level agreement (SLA) performance.

14. License

The supplier shall be responsible for obtaining the necessary export license/ permit/ authorization from the respective Government for exporting the materials/goods/equipment

to India, and all expenses incidental to the performance of statutory and non-statutory obligations in this regard shall be to the supplier's account.

15. Taxes and Duties

The supplier shall specify allapplicable taxes, duties, levies, and statutory charges in the commercial proposal.

16. Warranty

The Ceramic 3D Printer and its associated subsystems shall be covered under a comprehensive warranty for at least 24 months from successful commissioning. The warranty shall cover:

- All hardware, electronic, mechanical, and software components.
- Any manufacturing defects, functional failures, or performance degradation.
- On-site support for repairs or replacement of defective components at no extra cost.

During the warranty period, the vendor shall respond to service calls within 72 hours of notification and resolve issues within 14 working days, unless otherwise agreed. Software updates, firmware upgrades, and technical support will be free of charge during this period.

17. Annual Maintenance Contract (AMC)

Upon expiry of the warranty period, the VSSC may opt for a comprehensive Annual Maintenance Contract (AMC) for 3 years. Under AMC, the supplier shall:

- Conduct scheduled preventive maintenance visits at least once a year.
- Provide unlimited breakdown support and free replacement of parts covered under the contract.
- Maintain service history and furnish annual performance reports.
- Ensure remote diagnostics support (if applicable) and timely dispatch of service engineers.

The vendor shall submit the AMC commercial quote and terms along with the EoI response, with an option for the VSSC to decide at the time of contract finalization. The terms of AMC shall not be inferior to the warranty service levels.

18. Liquidated Damages (LD)

The delivery date stipulated in the order is the essence of the order. If the contractor fails to deliver the items within the time specified in the order or any extension thereof, a sum of one half percent (0.5%) of the total order value of the undelivered items for each calendar week of delay shall be recovered from the contractor as liquidated damage. The total liquidated damages shall not exceed five percent (5%) of total order value. Item will be deemed to have been delivered only when all items as per PO are delivered within the delivery period. If certain items are not delivered in time, it will be considered as delayed until such time as the delayed items are delivered. However in case of inordinate delays of more than one-fourth in completion / delivery period, LD @ a maximum of 10% of the total order value is applicable.

19. Security Deposit (SD)

A BANK GUARANTEE for the faithful execution of the contract / PO for 3% of the order value shall be provided immediately within 10 days after receipt of the order towards the performance of the contract. The Bank Guarantee should be from a Nationalised / Scheduled Bank in Rs 200 non- judicial stamp paper valid till the completion of scope of work / supply as per the order plus 60 days. This will not carry any interest and shall be returned to you after successful completion of scope of work/ supply against your request. In case of non performance /poor performance the Bank Guarantee shall be forfeited. If BG is not submitted within the specified period, this order is liable to be cancelled.

20. Performance Bank Guarantee (PBG)

A Bank Guarantee for 3% of the order value shall be provided immediately within 10 days after supply or along with supply towards the performance of the system. The Bank Guarantee should be from a Nationalised/ Scheduled Bank in Rs 200 non judicial stamp paper valid till the successful completion of warranty period plus 60 days. This will not carry any interest and shall be returned to you after successful completion of warranty period against your request. In case of non performance / poor performance the Bank Guarantee shall be forfeited.

21. Attention to Bidders

21.1. The document shall be carefully read, and all points duly addressed. Respondents are advised to study all the instructions, scope, bidding process, eligibility criteria, review & selection process, terms & conditions, timelines, and all annexures with

- due importance. EOI shall be deemed to have been done after a careful study and examination of this document, with complete understanding of its implications
- 21.2. Respondents should peruse this EOI only if they consider themselves eligible and possess all documents/information required as per this document.
- 21.3. This document seeking EOI is not an offer and is issued with no commitment. VSSC reserves the right to modify or withdraw this document or change any part thereof at any stage, without assigning any reasons whatsoever.
- 21.4. The requirements stated herein are minimum criteria, and VSSC reserves the right to request any additional information and also reserves the right to reject the EOI response of any Respondent, if in the opinion of VSSC, the data is incomplete or if the Respondent is found not qualified to perform the Contract satisfactorily.
- 21.5. The Respondents shall bear all costs and expenses, if any, associated with the preparation and submission of the EOI document, including post-EOI clarifications, discussions, technical and other presentations, and VSSC will in no case be responsible or liable for such costs, regardless of the outcome of the process. The Respondents shall also not be entitled to claim any costs, charges, and expenses incidental to or incurred by them through or in connection with the submission of EOI or its consideration by VSSC.
- 21.6. The response to this EOI invite should be complete in all respects. Failure to furnish all requisite information and/or documents sought through this document or submission of EOI not substantially responsive to this document to every respect will be at the risk of the Respondent and may result in rejection of the offer. Responses which are not in compliance with the terms & conditions shall be rejected, without assigning any reasons thereof. Also, if a Respondent is found ineligible after opening the EOI, the EOI submitted by the Respondent shall become invalid ipso facto, and any cost borne by the Respondent while responding to this document shall not be refunded. No further correspondence shall be entertained with respect to this.
- 21.7. The EOI document must be neatly typewritten. Handwritten submissions shall be avoided.
- 21.8. Canvassing in connection with the EOI is strictly prohibited, and such canvassed EOI submitted by a Respondent Agency is liable to be rejected.
- 21.9. Respondent shall not submit multiple EOIs through other Affiliates.
- 21.10. Addendum / Corrigendum, if any, to this document will be hosted at our website, www.isro.gov.in. Respondents shall regularly monitor.
- 21.11. Validity of the vendor empanelment: Two years.

22. Pre-Qualification Criteria

The bidder shall provide

- 22.1. A brief description of the background and organization of your firm/entity.
- 22.2. The turnover of the company is based on the audited accounts of the previous three years.
- 22.3. A copy of the last three years' Income Tax returns shall be provided.
- 22.4. The bidders shall provide a valid authorization certificate from the manufacturer that they are the authorized dealer/distributor/agent for the items in our locality.
- 22.5. Your previous experience: Copies of Purchase Orders awarded to you by any Government/PSUs shall also be attached.
- 22.6. Foreign vendors are also encouraged to respond to the invitation for EoI.
- 22.7. Any false declaration and non-compliance with the above would be grounds for immediate rejection of the offer or termination of the contract and further legal action per the laws.
- 22.8. Validity of Registration: Registration should be valid at the time of submission of bids and at the time of placing the Purchase Order (PO).
- 22.9. However, foreign vendors with authorized representatives for service, maintenance, and other support activities in India shall be encouraged.
- 22.10. Preference will be given to Class I Local Suppliers, and in their absence, Class II Local Suppliers will be considered.

23. Pre-EOI/Pre-bid Meeting

Though this document specifies the requirement in detail, there shall be an opportunity for the respondents to have a better understanding of the scope of work, activities involved, and terms & conditions of the EOI. Respondents shall clarify doubts, if any, during the Pre-EOI meeting as scheduled below.

The respondents who would like to participate in the pre-EOI meeting **shall register their** interest at **spso_mme_pur@vssc.gov.in** by **14.00 hours (IST) on 22-09-2025.**

- Tentative Schedule of **Pre-EOI meeting** shall be between 24-09-2025 and 26-09-2025.
- Time will be communicated through email
- <u>Venue</u>: Hybrid mode (Online link and Offline venue will be shared via email

Pre-EoI meeting details shall be sent to the interested firms only. Respondent(s)

are requested to note that any request to advance/postpone this deadline will not be

entertained under any circumstances. Interested Respondent(s) are hereby requested to

communicate their queries to the following address within the deadline given above.

Contact Details

Senior Purchase & Stores Officer

Purchase Unit V, MME Purchase,

RFF Area, Thumba P.O.,

Thiruvananthapuram – 695022

Kerala, India

Contact E-mail: spso_mme_pur@vssc.gov.in

24. Submission of response to EOI Invitation/ EOI

A complete response to the EOI must be received at VSSC at the address given below, no

later than the date specified above. EOI in the prescribed format as per the requirements,

terms & conditions mentioned in Annexure 1 shall be submitted in a sealed cover

superscribed with our Ref. No, and the due date for EOI. All the pages of the EOI submitted

must be numbered and signed by the authorized signatory.

The EOI must be submitted on or before the due date. VSSC will not be responsible for non-

receipt of the offer due to any postal delays/loss of response documents in transit, delays

due to customs/courier, etc. It shall be the sole responsibility of the Respondents to ensure

delivery of the offers within the time fixed. An offer received after the stipulated time and

date will be rejected outright.

Submission of EOI by e-mail will not be accepted.

Respondent(s) are requested to note that any request for extension of the last date for

submission of EOI will not be entertained under any circumstances.

Details of the addressee to whom EOI shall be sent:

Senior Purchase & Stores Officer

Purchase Unit V, MME Purchase,

RFF Area, Thumba P.O.,

Thiruvananthapuram – 695022

Kerala, India

Contact E-mail: spso mme pur@vssc.gov.in

Contact Phone: 0471 256 2831

25. Bidding Process

This is a two-stage Bidding Process. The first stage consists of inviting responses/interest through an EOI. Technically qualified respondents will be identified from the EOI responses.

In the second stage, RFP would be issued to the successful Respondents [Bidders]. RFP would be a two-part limited Tender document detailing the entire scope of work, responsibilities of the Service Provider and the Service Receiver, resource requirements, list of deliverables and activities to be carried out, timelines, costing formats, commercial terms and conditions, including payment terms. A Pre-bid meeting will be organized with all Bidders to facilitate proper understanding of the requirements, as mentioned in the RFP. The Bidders shall submit the bid in 2 parts:

- a. Techno-commercial (non-priced) bid
- b. Price bid.

Upon evaluation of the Techno-commercial bid and post-bid techno-commercial meeting(s) / clarifications, if required, the Service Receiver will shortlist the successful Bidders and place them on equal footing. Service Receiver will open the price bids of the shortlisted Bidders, hold a post-bid price negotiation meeting, if required, and award the Contract based on the lowest offer.

26. Sequence of events and tentative schedule

#	Activity	Tentative Schedule
1	Release of the Invite Document for EOI	15-09-2025
2	Deadline for registering for Pre-bid meeting & sending pre-bid clarification	22-09-2025; 14.00 Hrs (IST).
3	Tentative date for Pre-pid meeting	Between 24-09-2025 and 26-09-2025
4	Submission of EOI	16-10-2025; 14:00 Hrs (IST)
5	Opening date of EOI	17-10-2025; 11:00 Hrs. [T0]
6	Review of EOI offers	T0 + 10 days
7	Presentations by Shortlisted Respondents	T0 + 25 days
8	Finalisation of Bidders	T0 + 30 days

27. Language

The Proposal submitted by the Respondents shall be in English only. If any supporting documents submitted are in any language other than English, translation of the same in English is to be duly attested by the corresponding Respondent. For purposes of interpretation of the documents, the English translation shall govern. All correspondence and documents relating to the Proposal exchanged by the Respondent and Service Receiver shall also be written in English.

28. General Terms and Conditions

- 28.1. Outsourcing / Sub-contracting of the activity, undertaken through this Contract, to a third party can be allowed only with the prior approval of the Service Receiver. In such cases, the prime Service Provider shall select Co-Contractor(s) / Sub-contractor(s) with the necessary technical capabilities for executing the activities under the sub-contracted scope. However, the prime Service Provider shall be responsible and directly accountable to the Service Receiver for complete fulfilment of the Contract within the stipulated timeline, irrespective of anyshortcomings from the third-party contracts.
- 28.2. The system implemented and operationalized by the Service Provider in collaboration with the Service Receiver as a response to this process [EOI / RFP] shall not be allowed to be used for marketing/business purposes without prior permission from the Service Receiver. Service Receiver reserves the right to accord or not to accord permission in such cases, considering the overall national interests.
- 28.3. The successful Respondents [Bidders] shall be required to enter into a Non-Disclosure Agreement [NDA) With VSSC, for maintaining the confidentiality of data provided in the RFP document. The NDA shall be executed on a ₹ 100 stamp paper and should be as per the format given herewith.
- 28.4. Service Receiver reserves the right to induct the system developed through this EOI into all its programmes, depending upon the requirements.
- 28.5. Once the contract is entered into, the vendor/OEM/Service provider/the party shall design, fabricate, supply a Ceramic AM facility, supply essential components and spares, and assist VSSC in the co-development of formulation of feedstock material for the ceramic 3D printer based on mutual agreement. The VSSC shall legally agree upon this. In case of premature contract termination from the VSSC side, the supplier shall agree on the terms and conditions of termination, and losses incurred by the VSSC shall be settled.

28.6. After signing the Contract, the Service Provider has to submit a detailed Project Plan, which includes the overall completion period and key milestones vis-à-vis schedules, within 2 months for review/appraisal by VSSC In any case, the implementation shall be completed within 3 months, and customization shall be completed within 6 months from the placement of the order.

29. Conflict of Interest Declaration

30. Submission Requirements

- 30.1. Interested parties are requested to submit a detailed proposal against the abovementioned technical requirements, including the following:
- 30.2. Profile of the Company/Organization/Partnership/Joint Venture
- 30.3. Relevant past projects and client references.
- 30.4. Technical proposal outlining the concept and approach for setting up the facility.
- 30.5. Details of 3D printing technology and post-processing equipment are proposed.
- 30.6. Timeline and milestones.
- 30.7. Indicative cost estimate and funding model (joint venture, grant-based, PPP, etc.).
- 30.8. Team structure and key personnel qualifications.
- 30.9. Any IP or licensing constraints, if applicable.

31. Confidentiality/Integrity

The supplier shall guarantee that all technical information and technology provided by VSSC, within the scope of this agreement, shall be treated as "Top Secret" and "Confidential" and will not be divulged to any other party or otherwise made public. The documentation issued by VSSC shall be kept with the supplier in safe custody and in a suitable condition for the entire agreement period or extension thereof, as the case may be.

32. Intellectual Property Rights

Any intellectual property that evolves from this facility will be jointly registered in India and/or abroad and owned jointly. The procedural formalities for securing and maintaining the intellectual property rights, patents/copyright, if any, shall be carried out by VSSC/ISRO, and the expenditure incurred thereof shall be equally borne by VSSC/ISRO and the supplier

33. Review/Evaluation of EOI

- 33.1. Interested parties must meet the following minimum requirements: The EOI responses will be evaluated based on:
- 33.2. Proven expertise in additive manufacturing of ceramics.
- 33.3. Previous experience in installing or developing industrial or research-grade 3D printers meant for shaping ceramic parts.
- 33.4. Technical and financial capability to execute the project.
- 33.5. Must have an application support centre in India.
- 33.6. Experience with government/industry-academia collaborative projects (preferred).
- 33.7. Legal entity registered in India or authorized to operate within India.
- 33.8. Technical merit and innovation.
- 33.9. Experience and track record.
- 33.10. Feasibility and scalability of the proposed facility.
- 33.11. Alignment with national/sectoral priorities.
- 33.12. Future technical support and the opportunity for open collaboration
- 33.13. Financial proposal and sustainability model.
- 33.14. Shortlisted applicants may be invited to give detailed presentations and technical discussions.

34. Disclaimer

This EOI is not a tender or Request for Proposal (RFP) and does not constitute a commitment by VSSC to proceed with the project. VSSC reserves the right to cancel or modify the process without assigning any reason.

FORMAT FOR SUBMISSION OF EOI

COMPANY LETTER HEAD

No. Date:

Senior Purchase & Stores Officer Purchase Unit V, MME Purchase, RFF Area, Thumba P.O., Thiruvananthapuram – 695022 Kerala

Sir / Madam,

Sub: Submission of Expression of Interest

Ref: Your Tender Enquiry No.....

With respect to your EOI invitation notice vide above-referred Tender enquiry, we hereby submit our Expression of Interest to participate in the Bidding for "Establishing (Design, Fabricate, Supply, Install &Commission) a Ceramic 3D printing facility at VSSC". We attach the relevant documents requested in your invitation for the EOI notice.

We confirm that the information contained in this EOI or any part thereof, including its exhibits, and other documents and instruments delivered or to be delivered to the Service Receiver, is true, accurate, verifiable, and complete. This response includes all information necessary to ensure that the statements therein do not, in whole or in part, mislead Service Receiver in its short-listing process.

We fully understand and agree to comply with the fact that on verification, if any of the information provided here is found to be misleading in the short-listing process, we are liable to be dismissed from the selection process or termination of the Contract after executing the Contract.

We agree to accept all the terms and conditions in the Invitation of EOI document.

It is hereby confirmed that I / We are entitled to act on behalf of our company/corporation/firm/organization and are empowered to sign this document andother documents that may be required in this connection.

Thanking you,

Yours faithfully

EOI No: 6084 2025 00 1968 01

Seal / Stamp

RESPONDENT'S PROFILE

S.No.	Particulars	Responsefrom Respondent
	Company Profile	
	Name	
	Country of Incorporation	
	Date of incorporation and/or commencement of business	
	Year of establishment of the Company	
	Specify the type of the Company [Government / Public sector / Private sector]	
	Specify whether you are a based or Foreign company with an office in India or a Foreign company.	
1	company	
	Address of the corporate headquarters and its branch office(s), if any, in India	
	Corporate Website URL	
	Brief description of the Company, including details of its main lines of business and proposed role and responsibilities in this Project	
	[Separate sheets, not more than two pages, may be attached, if required.]	
	Addresses of operational setups in India (Highlight the areas where the Service Receiver can visit for an Audit)	
	Details of individual(s) who will serve as the point of the Service Receiver:	f contact/communication for
2	Name:	
	Designation:	

	Company:	
	Address:	
	Telephone Number:	
	E-Mail Address:	
	Fax Number	
	Particulars of the Authorized Signatory of the Respon	dent
	Name:	
3	Designation:	
	Address:	
	Phone Number:	
	Fax Number	

COMPLIANCE MATRIX

S.No.	Description	Compliance (Yes/No)	Remarks
1.	Whether the document has been read completely, fully understood and can be complied with?		
2.	Are you ready to submit a written response document/Expression of Interest (EOI) against this invitation for EOI?		
3.	Are you agreeing to execute the scope of work as in section 3.2 of this document, if selected?		
4.	Are you planning to involve any third party for executing the scope of work? If 'yes' provide details.		
5.	Have you compared the offered technology with other technologies available in the field of ceramic 3D printing?		
6.	Have you answered all the technical queries listed in here?		
7.	Are you agreeing to supply ready to print ceramic		

S.No.	Description	Compliance (Yes/No)	Remarks
	feedstock for most common technical ceramics?		
8.	Are you willing to supply, install and commission the facility at VSSC?		
9.	Are you ready to provide comprehensive training upon successful installation & commissioning?		
10.	Are you ready to provide technological services in terms of knowledge transfer/consultancy towards the processing or formulation of ceramic feedstock material and towards customised ceramic 3D printing solutions?		
11.	Are you ready to supply the consumables required for printing?		
12.	Are you ready to supply accessories, tools and spares required for 3 years of trouble-free operation?		
13.	Are you ready to take up the AMC after the warranty period as per stipulated conditions mentioned herein?		

S.No.	Description	Compliance (Yes/No)	Remarks
14.	Does the system support online maintenance?		
15.	Are willing provide online support in the event of emergency break-down?		
16.	Is the Respondent an OEM?		
17.	Is the Respondent a Foreign party?		
18.	Is the Respondent an OEM's authorized dealer?		
19.	Is the Respondent a registered Indian company, owned by Resident Indian citizens, and with a majority of the Board of Directors being Resident Indian citizens?		

S.No.	Description	Compliance (Yes/No)	Remarks
20.	Has the Respondent submitted complete information on the company, human resources, infrastructure, assets, financial standing, line of business, and credentials?		
21.	Do you have minimum five-years (up to the date of EOI submission) of experience in the field of ceramic 3D printing?		
22.	Does the respondent or his partner has sufficient knowledge and experience in ceramic 3D printing?		
23.	Are you ready to provide a comprehensive presentation to the Service Receiver at the desired location, covering their business profile, compliance with terms and conditions, and proposed execution strategy?		
24.	Are you ready to demonstrate all functionalities of the machine during the presentation?		
25.	Has the Respondent had an average annual turnover of Rs 30 Crore for the last three financial years, ending	_	

S.No.	Description	Compliance (Yes/No)	Remarks
	31st March of the corresponding year?		
26.	Has the Respondent incurred a loss in any of the last three consecutive financial years [FY 2022-23, FY 2023-24, and FY 2024-25], ending on 31 st March of the corresponding year?		
27.	Whether the Respondent has been blacklisted by any Central / State Government Department / Public Sector Undertakings / Central Government funded Organizations / State Government funded Organizations / World Bank, or other World Bank organizations OR whether Respondent is under any illegal expression by Government of India?		
28.	Does the Respondent have outstanding bankruptcy, judgment, or pending legal action that could impair the operations as a going concern?		
29.	Are you ready to enter into a Non-Disclosure Agreement with Service Receiver for maintaining the confidentiality of data provided in the RFP document?		

Mandatory Declaration to be attached by bidders regarding restrictions on procurement from the bidder of a country which shares a land border with India.

(In the Letter Head of the Bidder) - The below matter may be submitted in your letter Head

As per the provision of Office Memorandum N0. F.N0. 6/18/2019- PPD dtd. 23.07.2020 (i.e., Rule No. 144 (xi) of GFR) and its Amendments dtd 23.02.2023, issued by Department of Expenditure, Ministry of Finance. I hereby declare and certify the following.

- (1) I have read the clause regarding restrictions on procurement from the bidder of a country which shares a land border with India.
- (2) I certify that this bidder is not from such a country or, if from such a country. I have registered with the Department for Promotion of Industry and Internal Trade. Bidder from a country which shares a land border with India for the purpose of the Order means: (2.1) An entity incorporated, established or registered in such a country; or (2.2) A subsidiary of an entity incorporated established or registered in such a country; or (2.3) An entity substantially controlled through entities incorporated established or registered in such a country; or (2.4) An entity whose beneficial owner is situated in such a country; or (2.5) An Indian (or other) agent of such an entity; or (2.6) A natural person who is a citizen of such a country; or (2.7) A consortium or joint venture where any member of the consortium or joint venture falls under any of the above.
- (3) I hereby certify that I am not an agent as defined in the order who procures and supplies finished goods from an entity from a country which shares a land border with India, regardless of the nature of legal or commercial relationship with the producer of the goods.
- (4) I hereby certify that this bidder fulfills all requirements in this regard and is eligible to be considered.

Date:

(Authorised Signatory) (Seal)

Pre-qualification criteria

- 1. The bidder shall provide
 - (a) A brief description of the background and organization of your firm/entity.
 - (b) The turnover of the company on the basis of the audited accounts of the previous three years.
 - (c) Copy of the last three years Income Tax returns shall be provided.
 - (d) GST No.
- 2. The bidders shall provide valid authorization certificate from the manufacturer that they are the authorized dealer / distributor /agent for the items in our locality.
- 3. Your previous experience:
 Copies of Purchase Orders awarded to you by any Government/PSU's shall also be attached.
- 4. Only Class I and Class II Local suppliers as per Make in India Policy are eligible to participate in the bid.
- 5. Foreign vendors are not permitted to quote
- 6. The percentage of Local content should be specifically mentioned in the offer, with break-up and location details without which it will be summarily rejected.
- 7. Preference will be given to Class I Local Supplier and in their absence, Class II Local Suppliers will be considered.