

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

**Tender for Automated multi-axis multi-mode Ultrasonic C-Scan
System**

Bids to be submitted online

**Tender No.: VSSC/PURCHASE UNIT VI (CMSE Purchase)/VS202200691301 dated
17-04-2023**

A. Tender Details

Tender No : **VSSC/PURCHASE UNIT VI (CMSE Purchase)/VS202200691301**

Tender Date : **17-04-2023**

Tender Classification: **GOODS**

Purchase Entity : **PURCHASE UNIT VI (CMSE Purchase)**

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

Automated multi-axis multi-mode Ultrasonic C-Scan System

Quantity - 1 set

E-Procurement No. VSSC/PURCHASE UNIT VI (CMSE PURCHASE/CMSE/VS 2022 P 06913 01- Tenders are invited for the procurement of Automated Multi-axis multi-mode ultrasonic C-Scan system our Eprocurement site <https://eproc.vssc.gov.in>.

BIDS CAN BE SUBMITTED UPTO 22/05/2023 [14:00 Hrs.] , TECHNICAL BID OPENING DATE : 22/05/2023 [14:30 Hrs.].

Only online tenders will be accepted. No manual / Postal / e-mail / fax offers will be entertained. No manual tender document will be issued. Parties interested to participate in this e-Tender are required to register themselves as vendors, if not already registered, in our e-procurement portal <https://eproc.vssc.gov.in> by downloading plugins and help demos listed on the home page of the e-procurement link mentioned above to complete the vendor registration process. They can seek help from help desk 0471-2565454 also as provided in the home page of e-procurement portal in case of any problem for registration and subsequent process. Vendors may please note that without registering in our e-procurement portal, they will not be able to quote for this e-tender.

Important Notice : Tender will be automatically closed on the due date [i.e. 22/05/2023 14:00 hrs.], if at least one offer is received. If the tender could not be opened on the first day due to any technical snag, it will be opened on the subsequent day as per the schedule.

This is a two-part tender, Technical & Commercial part (Part I) and Price Part (Part II) shall be uploaded separately. The tenderers should not attach any documents containing Price information along with Technical & Commercial Bid (Part I). However, a copy of your PRICE BID, AMC quote, etc. WITHOUT PRICE SHALL BE UPLOADED in the Documents Solicited from the Vendor Field [available in Bid forms] TO KNOW THE PATTERN OF QUOTE. [ENSURE NOT TO MENTION Tender No :

VS202200691301

Tender Date : 17-04-2023 Purchase Entity : PURCHASE UNIT VI (CMSE Purchase) Centre : VSSC
ANY PRICE, OTHERWISE THE QUOTE WILL BE INVALID]. We do not open PART II (Price Bid), if
PART-I (Technical & Commercial offer) does not meet with our technical specification requirement.

THE TECHNICAL DOCUMENTS NEED TO BE ATTACHED ONLINE AS A SINGLE PDF
FILEWITHOUT ANY PRICE INFORMATION, TECHNICAL BID CONTAINING PRICE DETAILS
WILLBE TREATED AS REJECTED. Tender No : VS2022 00 6913 01 Tender Date : 17/04/2023
Purchase Entity :PURCHASE UNIT VI (CMSE Purchase) Centre :VSSC.

Price bid opening date indicated in the schedule is tentative only. Actual date will be determined after
evaluation of techno commercial bid. Quotations shall be uploaded as a separate documents

A.1 Tender Schedule

Bid Submission Start Date :	17-04-2023 17:11
Bid Clarification Due Date :	05-05-2023 15:31
Bid Submission Due Date :	25-05-2023 14:00
Bid Opening Date :	25-05-2023 15:00
Price Bid Opening Date :	30-05-2023 11:31

B. Tender Attachments

NA

Instructions To Vendors

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

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 Non-divisible category. b) The offers sought only from Class-I & Class-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 not divisible (ie., required quantity is 1 or as a package) and Services:

a) If L1 is from a 'Class-I local supplier', the contract will be awarded to L1 bidder.

b) If L1 is not from a 'Class-I local supplier', the lowest bidder among the 'Class-I local supplier' will be invited to match the L1 price subject to local supplier's quoted price falling within the margin of purchase preference (i.e. 20%) and the contract shall be awarded to such 'Class-I local supplier' subject to matching the L1 price (inclusive of duties, taxes and freight & insurance).

c) In case such lowest eligible 'Class-I local supplier' fails to match the L1 price, the 'Class-I local supplier' with the next higher bid within the margin of purchase preference shall be invited to match the L1 price and so on, and order/contract shall be awarded accordingly. In case where none of the 'Class-I local supplier' within the margin of purchase preference agree to match the L1 price, then the order/contract shall be awarded to the original L1 Bidder.

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.

2. Form No 20

1. INSTRUCTIONS TO TENDERERS

1. Quotation/Open Authorization shall be submitted online [only] complying specified schedule.
2. Late tenders and delayed tenders will not be considered.
3. Quotation should be valid for at least 90 days from the date of opening of the tender. [Mandatory]
4. As a Government of India Department, this office is exempted from payment of Octroi and similar local levies. Tenderers shall ensure that necessary Exemption Certificates are obtained by them from the Purchase Officer concerned to avoid any payment of such levies.
5. a) Your quotation should be valid for 90 days (Single Part Tender) / 180 days (Two Part Tender) from the date of opening of the tender. [Mandatory]
b) Prices are required to be quoted according to the units indicated in the annexed tender form. When quotations are given in terms of units other than those specified in the tender form, relationship between the two sets of units must be furnished.
6. Preference will be given to those tenders offering supplies from ready stocks and on the basis of FOR destination/delivery at site.
7. (a) All available technical literature, catalogues and other data in support of the specifications and details of the items should be attached along with the offer.
(b) Samples, if called for, should be submitted free of all charges by the tenderer and the Purchaser shall not be responsible for any loss or damage thereof due to any reason whatsoever. In the event of non acceptance of tender, the tenderer will have to remove the samples at his own expense.
(c) Approximate net and gross weight of the items offered shall be indicated in your offer. If dimensional details are available the same should also be indicated in your offer.
(d) Specifications: Stores offered should strictly confirm to our specifications. Deviations, if any, should be clearly indicated by the tenderer in his quotation. The tenderer should also indicate the Make/Type number of the stores offered and provide catalogues, technical literature and samples, wherever necessary, along with the quotations. Test Certificates, wherever necessary, should be forwarded along with supplies. Wherever options have been called for in our specifications, the tenderer should address all such options. Wherever specifically mentioned by us, the tenderer could suggest changes to specifications with appropriate response for the same.
8. The purchaser shall be under no obligation to accept the lowest or any tender and reserves the right of acceptance of the whole or any part of the tender or portions of the quantity offered and the

tenderers shall supply the same at the rates quoted.

9. The tenderer should supply along with his tender, the name of his bankers as well as the latest Income - Tax clearance certificate duly countersigned by the Income-Tax Officer of the Circle concerned under the seal of his office, if required by the Purchaser.

10. The Purchaser reserves the right to place order on the successful tenderer for additional quantity up to 25% of the quantity offered by them at the rates quoted.

11. The authority of the person signing the tender, if called for, should be produced.

TERMS & CONDITIONS OF TENDER

1. DEFINITIONS :

(a) The term Purchaser shall mean the President of India or his successors or assigns.

(b) The term Contractor shall mean, the person, firm or company with whom or with which the order for the supply of stores is placed and shall be deemed to include the Contractor's successors, representative, heirs, executors and administrators unless excluded by the Contract.

(c) The term Stores shall mean what the Contractor agrees to supply under the Contract as specified in the Purchase Order including erection of plants & machinery and subsequent testing, should such a condition is included in the Purchase Order.

(d) The term Purchase Order shall mean the communication signed on behalf of the Purchaser by an Officer duly authorized intimating the acceptance on behalf of the Purchaser on the terms and conditions mentioned or referred to in the said communication accepting the tender or offer of the Contractor for supply of stores or plant, machinery or equipment or part thereof.

2. PRICES:

Tender offering firm prices will be preferred. Where a price variation clause is insisted upon by a tenderer, quotation with a reasonable ceiling should be submitted. Such offers should invariably be supported by the base price taken into account at the time of tendering and also the formula for any such variation/s.

3. SECURITY DEPOSIT:

On acceptance of the tender, the Contractor shall, at the option of the Purchaser and within the period specified by him, deposit with him, in cash or in any other form as the Purchaser may determine, security deposit not exceeding ten percent of the value of the Contract as the Purchaser shall specify. If the Contractor is called upon by the Purchaser to deposit, SECURITY and the Contractor fails to provide the security within the period specified, such failure shall constitute a breach of the Contract, and the Purchaser shall be entitled to make other arrangements for the re-purchase of the stores Contracted at the risk of the Contractor in terms of Sub-Clause (ii) and (iii) of clause 10(b) hereof and/or to recover from the Contractor, damages arising from such cancellation.

4. GUARANTEE & REPLACEMENT :

(a) The Contractor shall guarantee that the stores supplied shall comply fully with the specifications laid down, for material, workmanship and performance.

(b) For a period of twelve months after the acceptance of the stores, if any defects are discovered therein or any defects therein found to have developed under proper use, arising from faulty stores design or workmanship, the Contractor shall remedy such defects at his own cost provided he is called upon to do so within a period of 14 months from the date of acceptance thereof by the purchaser who

shall state in writing in what respect the stores or any part thereof are faulty.

(c) If, in the opinion of the purchaser, it becomes necessary to replace or renew any defective stores such replacement or renewal shall be made by the Contractor free of all costs to the purchaser, provided the notice informing the Contractor of the defect is given by the purchaser in this regard within the said period of 14 months from the date of acceptance thereof.

(d) Should the Contractor fail to rectify the defects, the purchaser shall have the right to reject or repair or replace at the cost of the Contractor the whole or any portion of the defective stores.

(e) The decision of the purchaser notwithstanding any prior approval or acceptance or inspection thereof on behalf of the purchaser, as to whether or not the stores supplied by the Contractor are defective or any defect has developed within the said period of 12 months or as to whether the nature of the defects requires renewal or replacement, shall be final, conclusive and binding on the Contractor.

(f) To fulfill guarantee conditions outlined in clause 4 (a) to (e) above, the Contractor shall, at the option of the purchaser, furnish a Bank Guarantee (as prescribed by the purchaser) from a Bank approved by the purchaser for an amount equivalent to 10% of the value of the Contract along with first shipment documents. On the performance and completion of the Contract in all respects, the Bank Guarantee will be returned to the Contractor without any interest.

(g) All the replacement stores shall also be guaranteed for a period of 12 months from the date of arrival of the stores at purchaser's site.

(h) Even while the 12 months guarantee applies to all stores, in case where a greater period is called for by our specifications then such a specification shall apply in such cases the period of 14 months referred to in Para 4 (b) & (c) shall be the asked for guarantee period plus two months.

5. PACKING FORWARDING & INSURANCE :

The Contractor will be held responsible for the stores being sufficiently and properly packed for transport by rail, road, sea or air to withstand transit hazards and ensure safe arrival at the destination. The packing and marking of packages shall be done by and at the expense of the Contractor. The purchaser will not pay separately for transit insurance, all risks in transit being exclusively of the Contractor and the Purchaser shall pay only for such stores as are actually received in good condition in accordance with the Contract.

6. DESPATCH :

The Contractor is responsible for obtaining a clear receipt from the Transport Authorities specifying the goods despatched. The consignment should be despatched with clear Railway Receipt/Lorry Receipt. If sent in any other mode, it shall be at the risk of the Contractor. Purchaser will take no responsibility for short deliveries or wrong supply of goods when the same are booked on 'said to contain' basis. Purchaser shall pay for only such stores as are actually received by them in accordance with the Contract.

7. TEST CERTIFICATE :

Wherever required, test certificates should be sent along with the despatch documents.

8. ACCEPTANCE OF STORES:

(a) The stores shall be tendered by the Contractor for inspection at such places as may be specified by the purchaser at the Contractor's own risk, expense and cost.

(b) It is expressly agreed that the acceptance of the stores Contracted for, is subject to final approval by the purchaser, whose decision shall be final.

(c) If, in the opinion of the purchaser, all or any of the stores do not meet the performance or quality requirements specified in the Purchase Order, they may be either rejected or accepted at a price to be fixed by the purchaser and his decision as to rejection and the prices to be fixed shall be final and binding on the Contractor.

(d) If the whole or any part of the stores supplied are rejected in accordance with Clause No. 8 (c) above, the purchaser shall be at liberty, with or without notice to the Contractor, to purchase in the open market at the expense of the Contractor stores meeting the necessary performance and quality Contracted for in place of those rejected, provided that either the purchase, or the agreement to purchase, from another supplier is made within six months from the date of rejection of the stores as aforesaid.

9. REJECTED STORES:

Rejected stores will remain at destination at the Contractor's risk and responsibility. If instructions for their disposal are not received from the Contractor within a period of 14 days from the date of receipt of the advice of rejection, the purchaser or his representative has, at his discretion, the right to scrap or sell or consign the rejected stores to Contractor's address at the Contractor's entire risk and expense, freight being payable by the Contractor at actuals.

10. DELIVERY:

(a) The time for and the date of delivery of the stores stipulated in the Purchase Order shall be deemed to be the essence of the Contract and delivery must be completed on or before the specified dates.

(b) Should the Contractor fail to deliver the stores or any consignment thereof within the period prescribed for such delivery, the purchaser shall be entitled at his option either.

(i) to recover from the Contractor as agreed liquidated damages and not by way of penalty, a sum of 0.5% per week of the price of any stores which the Contractor has failed to deliver as aforesaid or during which the delivery of such store may be in arrears subject to a minimum of 10%, or

(ii) to purchase from elsewhere, without notice to the Contractor on the account and at the risk of the Contractor, the stores not delivered or others of a similar description (where others exactly complying with the particulars, are not, in the opinion of the purchaser, readily procurable, such opinion being final) without cancelling the Contract in respect of the consignment (s) not yet due for delivery, or

(iii) to cancel the Contract or a portion thereof and if so desired to purchase or authorise the purchase of stores not so delivered or others of a similar description (where others exactly if complying with the particulars are not, in the opinion of the purchaser, readily procurable, such opinion final) at the risk and cost of the Contractor.

In the event of action being taken under sub-clause (ii) & (iii) of clause 10 (b) above, the Contractor shall be liable for any loss which the purchaser may sustain on that account, provided that the re-purchase or if there is an agreement to repurchase then such agreement is made within six months from the date of such failure. But the Contractor shall not be entitled to any gain on such re-purchase made against default. The manner and method of such re-purchase shall be at the discretion of the purchaser, whose decision shall be final. It shall not be necessary for the purchaser to serve a notice of

such re-purchase on the defaulting Contractor. This right shall be without prejudice to the right of the purchaser to recover damages for breach of Contract by the Contractor.

11. EXTENSION OF TIME :

As soon as it is apparent that the Contract dates cannot be adhered to, an application shall be sent by the Contractor to the purchaser. If failure, on the part of the Contractor, to deliver the stores in proper time shall have arisen from any cause which the purchaser may admit as reasonable ground for an extension of the time (and his decision shall be final) he may allow such additional time as he considers it to be justified by circumstances, of the case without prejudice to the purchasers right to recover liquidated damages under clause 10 thereof.

12. ERECTION OF PLANT & MACHINERY :

Wherever erection of a plant or machinery is the responsibility of the Contractor as per the terms of the Contract and in case the Contractor fails to carry out the erection as and when called upon to do so within the period specified by the purchaser, the purchaser shall have the right to get the erection done through any source of his choice. In such an event, the Contractor shall be liable to bear any additional expenditure that the purchaser is liable to incur towards erection. The Contractor shall, however, not be entitled to any gain due to such an action by the purchaser.

13. PAYMENT :

Contractor's bill will be passed for payment only after the stores have been received, inspected and accepted by the Purchaser.

14. MODE OF PAYMENT :

Normally payment will be made for the accepted stores within 30 days from the date of receipt of the materials.

15. RECOVERY OF SUM DUE:

Whenever any claim for the payment of, whether liquidated or not, money arising out of or under this Contract against the Contractor, the purchaser shall be entitled to recover such sum by appropriating in part or whole, the security deposited by the Contractor, if a security is taken against the Contract. In the event of the security being insufficient or if no security has been taken from the Contractor, then the balance or the total sum recoverable as the case may be, shall be deducted from any sum then due or which at any time thereafter may become due to the Contractor under this or any other Contract with the purchaser. Should this sum be not sufficient to cover the full amount recoverable, the Contractor shall pay to the purchaser on demand the remaining balance due. Similarly, if the purchaser has or makes any claim, whether liquidated or not, against the Contractor under any other Contract with the purchaser, the payment of all moneys payable under the Contract to the Contractor including the security deposit shall be withheld till such claims of the purchaser are finally adjudicated upon and paid by the Contractor.

16. INDEMNITY :

The Contractor shall warrant and be deemed to have warranted that all stores supplied against this Contract are free and clean of infringement of any Patent, Copyright or Trademark, and shall at all times indemnify the purchaser against all claims which may be made in respect of the stores for infringement of any right protected by Patent Registration of design or Trade mark and shall take all risk of accidents or damage which may cause a failure of the supply from whatever cause arising and the entire responsibility for sufficiency of all means used by him for the fulfillment of the contract.

17. ARBITRATION :

In the event of any question, dispute or difference arising under these conditions or any conditions contained in the Purchase Order or in connection with this Contract (except as to any matter the decision of which is specially provided for by these conditions), the same shall be referred to the sole arbitration of the Head of the Purchase office or some other person appointed by him. It will be no objection that the arbitrator is a Government servant, that he had to deal with matter to which the Contract relates or that in the course of his duties as Government servant he has expressed views on all or any other matters in dispute or difference. The award of the arbitrator shall be final and binding on the parties of this Contract.

If the arbitrator be the Head of the Centre/Unit

(i) In the event of his being transferred or vacating his office by resignation or otherwise, it shall be lawful for his successor-in-office either to proceed with reference himself, or to appoint another person as arbitrator, or

(ii) In the event of his being unwilling or unable to act for any reason, it shall be lawful for the Head of the Centre/Unit to appoint another person as arbitrator.

If the arbitrator be a person appointed by the Head of the Purchase Office

In the event of his dying, neglecting or refusing to act or resigning or being unable to act, for any reason, it shall be lawful for the Head of the Centre/Unit either to proceed with the reference himself or appoint another person as arbitrator in place of the outgoing arbitrator.

Subject as aforesaid the Arbitration & Conciliation Act 1996 and the rules there under and any statutory modifications thereof for the time being in force shall be deemed to apply to the arbitration proceedings under this Clause. The Arbitrator shall have the power to extend with the consent of the purchaser and the Contractor the time for making and publishing the award. The venue of arbitration shall be the place as purchaser in his absolute discretion may determine. Work under the Contract shall, if reasonably possible, continue during arbitration proceedings.

In the event of any dispute or difference relating to the interpretation and application for the provisions of the Contracts, such dispute or difference shall be referred by either party to Arbitration of one of the Arbitrations in the Department of Public Enterprises. The Arbitration Act 1996 shall not be applicable to arbitration under this clause. The award of the Arbitrator shall be binding upon the parties to the dispute provided however any party aggrieved by such award may make a further reference for setting aside or revision of the award to the Law Secretary, Department of Legal Affairs, Ministry of Law & Justice, Govt. of India. The parties to the dispute will share equally, the cost of arbitration as intimated by Arbitrator.

18. COUNTER TERMS AND CONDITION OF SUPPLIERS :

Where counter terms and conditions printed or cyclostyled conditions have been offered by the supplier, the same shall not be deemed to have been accepted by the Purchaser, unless specific written acceptance thereof is obtained.

19. SECURITY FOR PURCHASE OF MATERIALS :

Successful tenderer will have to furnish in the form of a bank guarantee or any other form as called for by the purchaser towards adequate security for the materials and properties provided by the Purchaser for the due execution of the Contract.

3. GENERAL TERMS & CONDITONS (WITH WARRANTY)

1. 10.Security deposit : You should submit Bank Guarantee (Rs.200/- stamp paper) for 10% order value (DOS:PM:09 format enclosed) from a Nationalised/Scheduled bank valid for 2 months beyond the date of completion of order along with order acknowledgement. This security deposit without any interest thereon shall be returned to the Contractor on successful completion of the contract or shall be adjusted/forfeited against non-fulfillment of any of the contractual obligations.
2. 11.Warranty: Warranty should be indicated in the quotation if applicable
3. 12.Performance Bank Guarantee: You shall furnish performance Bank Guarantee in Rs.200/-non judicial stamp paper from a Nationalized/Scheduled Bank Equivalent to 10% of the order value which shall be valid beyond 2 months from the expiry of warranty/guarantee period.
4. 13.We would like to have more than one source of supply and the final orders will be given accordingly to the qualified bidders.
5. 16. VSSC-CMSE has a right to cancel the tender without assigning any reason etc.
6. 17. If you are unable to submit offer, the same may be communicated to us before the due date.
7. 18. "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."
8. 19. All Tax invoices issued by suppliers/Service providers on or after July 01,2017 shall invariably bear their GST Registration No.(GSTIN) applicable GST rates and HSN Code. In the absence of which, the invoices shall not be processed for payment.
9. 2.Please keep & confirm the offer validity minimum 90 days from the date of opening of tender.
10. 3.GST extra as applicable as per HSN code. Specify HSN code with applicable GST in your quotation.
11. 6.Delivery term: Our standard delivery term is FOR : CMSE-VSSC. In case of Ex- Works, please indicate packing, forwarding & freight charges up to VSSC, separately. (For more details please see Form No. 19/20/21/22/ 23 attached)

12. 8. In order to avail of the benefits extended to by Govt. of India to the Micro and Small Sectors, please submit attested copy of the valid Entrepreneur Memorandum Part-II signed by the General Manager, District Industries Centre / UdyogAdhar/ NSIC Registration Certification along with your offer.

13. 9. Liquidated damages: The delivery period quoted by you and stipulated in the Purchase Order shall be deemed to be the essence of the order and delivery must be completed not later than the dates specified therein as otherwise VSSC shall have the right to recover a sum @ 0.5% of the order value per week/part of a week or 0.5% of the value of the stores for which the delivery is delayed for each week of delay, as the case may be, subject to a maximum of 10% of the order value.

14. (b) 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.

15. (c) 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

16. General Conditions:

1. Payment: Our standard payment term is 100% within 30 days on receipt and acceptance of the item at our site .

4. This is a two-part tender, Technical & Commercial part (Part I) and Price Part (Part II) shall be uploaded separately.

C. Bid Templates

C.1 Technical Bid - Automated multi-axis multi-mode Ultrasonic C-Scan System

1. Automated multi-axis multi-mode Ultrasonic C-Scan System

Item specifications for Automated multi-axis multi-mode Ultrasonic C-Scan System

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	1) Introduction	Composites Entity, VSSC intends to procure an "Automated multi-axis, multi-mode Ultrasonic C-Scan System" for Non-Destructive Testing (NDT) of Composites Structures from suppliers with the requisite expertise and heritage. The system shall enable ultrasonic non-destructive testing in the following modes: 1. Air-Coupled C-Scan Ultrasonic testing in Through transmission (TTU) and Pitch-catch modes 2. Water jet C-Scan Ultrasonic testing in TTU & Pulse echo (PE) modes 3. Water bubbler type Phased Array Ultrasonic C-Scan testing (PAUT) in PE mode	Yes / No / Explain		

2	2) Scope of supply	<p>Scope of supply consists of "Design, Manufacture, Performance Demonstration, Delivery, Installation, Commissioning and Training of Automated multi-axis, multi-mode Ultrasonic C-Scan System" on "turn-key basis" at Composites Entity (CMSE), VSSC, Vattiyoorkavu, Trivandrum, Kerala, India. The system is intended for NDT of Composites Structures.</p> <p>The system shall consist of</p> <p>2.1 Necessary ultrasonic hardware and software for</p> <p>a) Air-Coupled C-Scan Ultrasonic testing in TTU and Pitch-catch modes</p> <p>b) Water jet C-Scan Ultrasonic testing in TTU & PE modes</p> <p>c) Water bubbler type PAUT mode</p> <p>2.2 "Dual robotic type probe positioning system" including hardware, software & system integration as per specifications given in Section 6.</p> <p>This system shall carry out the functions mentioned in Section 2.1, Section 4 & Section 7 on typical test articles mentioned in Section 3, and as per the other specifications given in this document.</p> <p>Note: Technical specification is attached in pdf format as Annexure 1.</p>	Yes / No / Explain		
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3	3) Parts to be tested	<p>Typical part configurations and geometries to be inspected are shown in table given in Annexure A.</p> <p>Note:</p> <p>1. Party shall provide the feasibility and scan plan for the above mentioned components with respect to the proposed system specifications.</p> <p>2. Maximum weight of the part to be tested is 200 kg.</p>	Yes / No / Explain		
4	<p>1) Part Geometry: Panels of flat, double curvature and Tapered (varying thickness) ; Material & constructional Features: CFRP sandwich, CFRP sandwich with cork bonded on one surface & Test method: Air coupled TTU/Water Jet TTU</p>	<p>Total sandwich thickness: 10 to 125mm Core thickness: 6mm to 120mm Cork thickness: 1 to 5 mm</p> <p>Size and figure is attached separately as Annexure A</p>	Yes / No / Explain		
5	<p>2) Part Geometry: Truncated Conical shell; Material & constructional Features: CFRP sandwich & Test method: Air coupled TTU</p>	<p>Diameter: Max 4200 mm Thickness: 6 to 12 mm</p> <p>Size and figure is attached separately as Annexure A.</p> <p>Note: Testing to be done by positioning the part in vertical plane without the requirements of a rotary table</p>	Yes / No / Explain		

6	<p>3) Part Geometry: Sector of cylinder & Sector of cone</p> <p>Material & constructional Features: CFRP Hat- stiffened & Test method: Water coupled bubbler PAUT</p>	<p>Basic shell thickness: 0.5 to 5 mm Hat thickness: 0.5 to 3 mm Minimum Distance between hats: 35mm Size and figure is attached separately as Annexure A. Note: Stringer bubbler tool mechanism and probes with necessary attachment to enable positive contact of PAUT probes while testing webs and crown of hat- stiffeners shall be provided</p>	Yes / No / Explain		
7	<p>4) Part Geometry: Tori-spherical shell; Material & constructional Features: CFRP Sandwich & laminate & Test method: Simultaneous Water jet TTU & PE</p>	<p>Opening of Small Diameter: 1000 mm Opening of Large Diameter: Max 2500 mm Max. Thickness: 16 mm Size and figure is attached separately as Annexure A.</p>	Yes / No / Explain		
8	<p>5) Part Geometry: Generic shapes and high curvatures; Material & constructional Features: CFRP Sandwich & laminate & Test method: Simultaneous Water jet TTU & PE</p>	<p>Inner Dia.: 200mm, Depth: 250mm; Length: 500mm to 5000mm Max. Thickness: 12mm Size and figure is attached separately as Annexure A. Note: Active axis can be considered to access this type of curvatures</p>	Yes / No / Explain		
9	<p>6)Part Geometry: Tube/Cylinder & Flat panel Material & constructional Features: CFRP laminated tubes & CFRP laminate & Test method: Water jet PE</p>	<p>Outer Dia. 125 mm minimum Thickness: 1 to 5mm Size and figure is attached separately as Annexure A.</p>	Yes / No / Explain		

10	4) Ultrasonic tests to be carried out	<p>The system shall enable identification of defects like delaminations, disbonds, porosity, inclusions etc., in laminated and sandwich constructions, as applicable, using the following ultrasonic modes:</p> <p>4.1 TTU mode: It uses two separate probes which are kept on either side of the component. One acts as a transmitter while other as a receiver. These probes have to be aligned to each other in such a way that the transmitter probe shall be normal to the test surface and both the transmitter and receiver probes axes shall be collinear. The test shall be in continuous scan mode.</p> <p>4.1.1 Air coupled TTU: In this, probes shall maintain a predefined stand-off distance from the component surface during the testing; based on air-coupled probe characteristics. Suitable system shall be configured to maintain the specified stand-off distance on either side of the test component.</p> <p>4.1.2 Water jet TTU: In this, probes use water-jet as coupling media. The probes shall maintain a predefined water column distance from the component surface during the testing; based on water-jet probe characteristics.</p>	Yes / No / Explain		
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4.2 PE mode: It uses a single probe which acts as both transmitter and receiver. Probe has to be normal to the component surface. The test shall be in continuous scan mode.

4.2.1 Water jet PE: In this, the testing will be carried out using water-jet as coupling media. The probes shall maintain a predefined water column distance from the component surface during the testing; based on water-jet probe characteristics. The probes on the independent robots shall perform pulse-echo and through transmission testing simultaneously on the same part. Also the probes on the independent robots shall be able to perform pulse-echo techniques simultaneously on the same part or on two different parts.

4.2.2 Water bubbler PAUT: In this, the testing is done using a phased array probe with water as couplant. The probe shall be in contact with the surface and shall exert a constant force at each point during testing.

4.3 Pitch-catch mode: It uses two separate air coupled probes which are kept on same side of the component. One acts as a transmitter while other as a receiver. These probes have to be separated and

		oriented to the surface to generate guided waves. Provision for adjustment of separation distance and orientation of the probes shall be provided. The test shall be in continuous scan mode.			
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11	5) System configuration	<p>The offered system shall incorporate following features:</p> <p>5.1 The entire system shall comprise of hardware and software systems.</p> <p>5.2 The hardware systems shall include dual robotic type probe positioning system, PC for positioner control, PC for simulation & data processing, ultrasonic pulser-receiver(s), ultrasonic probes & cables, data acquisition system, water management system, safety system etc.</p> <p>5.3 Software systems shall include modules for continuous scan path generation, synchronized interpolated motion control, data acquisition (position data & ultrasonic data), ultrasonic data processing and presentation in different scan formats such as A, B, C etc. The system shall have the necessary graphical user interface to enable the user to visualize, set parameters of the probe positioner & ultrasonic unit, simulate and execute the scan, visualize the post processed output.</p> <p>5.4 Laser or optical sensors or structured light camera end-effectors shall be provided for teach-in of part geometry through acquisition of point cloud data, whenever a part</p>	Yes / No / Explain		
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model is not available for part referencing. For non-uniform thick part, part geometry shall be generated by scanning both side surfaces.

5.5 Accuracy of reconstruction made using the acquired point clouds of part surface shall be less than 1mm.

5.6 The scan path part program shall be generated for C-scan from the data obtained from CAD models OR CAD models generated from point clouds taken by laser/optical / structured light camera end effectors. For CAD models the part program must be able to position the CAD model of the product at the desired location within the machine envelope and generate scan path.

5.7 The system shall carry out ultrasonic inspection of the test articles in automated mode following the generated scan paths, acquire the ultrasonic test data, integrate the data with the positioner location data, analyse & post process the acquired information in A, B & C scan formats, storage of the processed data, archival and retrieval. Wherever defects are located, the system shall be configured so as to re-position the probe at the defective location(s) based on the scan data.

5.8 Automatic defect

marking feature shall be provided.
 Necessary hardware and software shall be provided to mark the boundary of the defect on the product based on the post processed C-scan data.

5.9 Separate end effectors shall be provided for Air Coupled TTU, Air Coupled Pitch-catch, Water jet TTU, water jet PE, water bubbler PAUT, laser/optical /structured light camera and automatic defect marking.

5.10 The system shall have the capability that, if the scan is interrupted / stopped either deliberately or due to power failure, the system should be able continue the scan from the point where it was stopped, without the loss of data which were acquired till intentional stoppage/power failure.

5.11 The proposed system shall also have following features:

5.11.1 Scalability: System shall have capability to enable independent simultaneous pulse-echo testing using the two robots. It shall also allow configuring various end-effectors (like-Radii end-effector etc.). The inspection solution software shall allow the future upgrades.

5.11.2 The cable routing conduit shall have additional space to route the

cables for future addition of new end effectors. The details of such provision shall be given.

5.12 The 3D model and drawings of robotic end effector mounting plate shall be provided by the party. This is to integrate different types of end effector in future. Also, the 3D footprint of the machine elements and its assembly shall be shared as part of machine design, and the same shall be used during mutual discussions. The finalized model shall be provided to us in standard 3D CAD formats.

5.13 The system shall have the suite of image processing tools installed either in the programming station or another system with high resolution graphics for image processing, data archival and retrieval.

5.14 All axes shall be designed with adequate rigidity to ensure minimum electronic noise and vibration free 100% scanning coverage of complex 3D surfaces.

12	6) System specifications		-		
13	6.1 Dual robotic type probe positioning system		-		

14	1) General	<p>a) A dual robotic probe positioning system with appropriate sub-systems shall be configured in order to scan the typical parts listed in section 3.</p> <p>b) Robot shall be from the standard manufacturers like: Kuka or Staubli or ABB or equivalent.</p> <p>c) Robot shall fulfil the requirements of ISO 9283</p>	Yes / No / Explain		
15	2) Common vertical reach of Tool Centre Point (TCP) of both robots	4000 mm (Nominal) (attached separately as figure 2)	Yes / No / Explain		
16	3) Working width/Gap between both the robots	2500 mm (attached separately as figure 2)	Yes / No / Explain		
17	4) Linear (X-axis) movement of both the robots	7000 mm (minimum)	Yes / No / Explain		
18	5) Payload capability of each robot	80 Kg (minimum)	Yes / No / Explain		
19	6) End-effectors	<p>a) Air coupled TTU</p> <p>b) Air coupled Pitch-catch</p> <p>c) Water Jet TTU & PE</p> <p>d) Water bubbler PAUT</p> <p>e) Laser/optical /structured light camera</p> <p>f) Automatic defect marker</p>	Yes / No / Explain		
20	7) Automatic tool changer	<p>This device shall allow parking & pickup of all the above end effectors automatically.</p> <p>Facility shall be provided for future upgrades of the machine; to accommodate additional end effectors.</p>	Yes / No / Explain		

21	8) Number of tools to be parked simultaneously at a time on parking area of automatic tool changer	10 nos.(minimum) on a single common tool changer or two individual tool changer with 5 nos. of tools for each robot	Yes / No / Explain		
22	9) Overall dimensions	To be specified by the supplier with a detailed lay-out	Yes / No / Explain		

23	10) Construction	<p>a) Duly fabricated, machined, stress relieved, surface treated and painted. Detailed constructional features & layout of the dual robotic system to be provided. Material and process certification to be provided.</p> <p>b) Heavy duty, with sufficient strength & stiffness and capable of handling self-weight and the weight of end-effectors.</p> <p>c) The stability of operations under dynamic conditions for the maximum scan speed specified with worst case end effector mass & extreme robot extension conditions shall be demonstrated by design & measurements.</p> <p>d) Operation with low noise</p> <p>e) Compact size for operation inside high curvature components</p> <p>f) Dust & water proofing of motors, bearings and all other electronics of the system to protect against the dust & jetting water.</p> <p>g) Robotic shall be of min. IP65 class and end effectors IP67 class</p> <p>h) Stainless steel or anti-corrosive or corrosion protected materials for system parts which are coming in contact with water, appropriate paints for the frame and all other metal parts.</p> <p>i) The system is expected to work in</p>	Yes / No / Explain		
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		an area where overhead cranes are working. Hence protection / isolation against EMI/EMC shall be provided.			
24	11) Cable management	a) Proper cable management for easy maintenance and to enable the maximum speed of the system without affecting the SNR. b) Appropriate cable tray for ease of maintenance and to avoid cable bundling. c) Detailed cable routing plan, cable tagging plan and routing drawings to be provided at design review stage.	Yes / No / Explain		
25	12) Scan Speed range	a) 10 mm/s to 250 mm/s for Air coupled TTU, water jet PE and water bubbler PAUT b) 10mm/s to 1000 mm/s for water jet TTU	Yes / No / Explain		
26	13) Absolute positional accuracy of TCP	Within ± 0.1 mm per 1000mm and 1mm (max.) on complete inspection volume	Yes / No / Explain		
27	14) Repeatability of TCP	0.1 mm or less	Yes / No / Explain		
28	15) Alignment accuracy between two nozzles in TTU	Shall result in <2dB signal loss in the 95 % area in the entire working envelope.	Yes / No / Explain		
29	16) Maximum dwell time during indexing in 3D scanning mode	Less than 2 seconds	Yes / No / Explain		

30	17) Robot drive motors and encoders	<p>a) The motors and associated drive elements shall be from the standard manufacturers like Siemens or equivalent. The spare parts and service shall be available in India.</p> <p>b) Full technical catalogues of each of the elements from the OEM shall be provided.</p> <p>c) The motors shall be selected to avoid/minimise EMI/EMC. The EMI/EMC level must be less than 10% with respect to ultrasonic signal at max. gain used for normal testing of CFRP components.</p> <p>d) All motors shall be enclosed to minimize EMI interference.</p> <p>e) To get the required accuracy option like Secondary encoders for axes can be considered.</p>	Yes / No / Explain		
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31	18) Linear traverse drive elements and encoders	<p>a) The linear traverse for the two robots shall be provided.</p> <p>b) If fabricated by party, the following shall be complied:</p> <ul style="list-style-type: none"> o The drive motors shall be from Siemens or C-scan supplier's own make. o Details of the motors selected, power rating, life etc., shall be provided. o Details of the associated elements in the drive chain like couplings, gear box if any, with their make, rating etc., shall be provided. OEM catalogues shall be provided. o Details of the backlash elimination systems shall be provided. o The guide ways for the linear travel shall be through linear motion (LM) guides of reputed make. Make, class, rating, lubrication system, life etc., for the LM guides shall be provided. OEM catalogue shall be provided. o For each of the linear traverses, the feedback to the motion controller shall be through linear scales. Make, class, life, protection class etc., shall be provided. OEM catalogue shall be provided. <p>c) The linear traverse elements shall be mounted on very rigid machine base elements rigidly fixed to the foundation. The base support elements shall be duly fabricated,</p>	Yes / No / Explain		
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		<p>machined, stress relieved, surface treated and painted. Detailed constructional features & layout of the machine base to be provided. Material and process certification to be provided.</p> <p>d) The motors shall be selected to avoid/minimise EMI. The EMI level must be less than 10% with respect to ultrasonic signal at max. gain used for normal testing of CFRP components.</p> <p>e) All motors shall be enclosed to minimize EMI interference.</p> <p>f) All the elements of the two linear traverse shall be adequately protected against ingress of water, dust etc. Protection class shall be specified.</p>			
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32	19) Teach-in, referencing and scan path generation	<p>a) The teach-in tool shall acquire point cloud data of part geometry and reference points data in standard formats portable to CAD systems. Laser or optical end effectors or structural light camera shall be used. For non-uniform thick part, scanning shall be done on either side of the part. Details of the system to be furnished.</p> <p>b) Accuracy of reconstruction made using acquired point clouds of part surface shall be less than 1mm.</p> <p>c) The 3D CAD of the part along with the reference points shall be generated from the point cloud data. Same shall be used for scan path generation.</p> <p>d) For components which have CAD models, the reference points data from the part shall be acquired.</p> <p>e) Scan path shall be generated for C-scan from the data acquired as point clouds OR directly from CAD models. The part program must be able to position the CAD model of the product at the desired location within the machine envelope and generate scan path.</p> <p>f) The scan path generation program shall provide the scan path for different end effectors with variables such as scan rates, indexing rates, offset distance</p>	Yes / No / Explain		
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		<p>etc. Options & menu for water column variables shall be provided. Menu for selection of different scan path options shall be available.</p> <p>g) The scan path shall be visualised through graphical simulation software and shall be editable, if required. The visualiser shall provide alerts on collisions, axes limits, traverse limits etc.</p>			
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33	20) Control system for operations & precise execution of part program	<p>a) Motion control shall be based on industrial type CNC controllers of Siemens or C-scan supplier's own make.</p> <p>b) The hardware and software of the control system shall have sufficient numbers of simultaneously interpolated axes. This should result in continuous un-interrupted motion of the dual robots so as to execute the part program for the scan modes specified. The auxiliary systems like water management system etc., also shall be controlled in fully synchronised mode. Full technical details of the control system architecture, algorithm, number of axes participating for the specified scan modes etc., shall be provided.</p> <p>c) Operator panel with user friendly GUI for input of inspection parameters and program execution.</p> <p>d) Jog mode, MDA (Manual Data Automatic) mode and fully auto mode shall be enabled for the motion control.</p> <p>e) In Air/water jet TTU, the pulser probe shall be normal to the test surface and both (pulser& receiver) probes shall be collinear.</p> <p>f) In water jet PE, probe shall be normal to the test surface.</p> <p>g) In water jet TTU, the pulser probe shall also acquire PE data simultaneously,</p>	Yes / No / Explain		
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if required. Also the probes on the independent robots shall be able to perform pulse-echo techniques simultaneously on the same part or on two different parts.

h) In water bubbler PAUT, the probe(s) shall be in contact with the surface and shall exert a constant pressure during testing.

i) The probe holder of PAUT shall have suitable mechanism to hold and take care-of minor surface variation (± 5 degree in both planes) on the test part while testing.

j) Remote pendant shall be provided near the dual robot to control the movements of axis motion.

k) Pulser-receiver hardware shall be housed in controlled environment (Air-conditioned).

l) All the elements of the control system shall be housed in a cabinet with controlled environment using panel mounted air conditioning units.

m) The layout of the elements in the control cabinet shall be in accordance with standards in vogue and shall be clearly tagged. Sufficient access space shall be provided for maintenance.

n) UPS backup for 10 minutes minimum shall be provided for the controller and PC's for controlled shutdown without any loss of data

34	21) User interface for setting of the work	Each axis of motion shall be controlled from operator console and also from remote hand pendent to teach the point of scanning.	Yes / No / Explain		
35	22) Lubrication system	Automatic PLC controlled drip free lubrication system	Yes / No / Explain		
36	23) Flooring of the scan area	The flooring shall be designed for a maximum weight (part along with test fixture) of 5 ton. The base shall have: a) Powder coated steel frame b) Opening provision for maintenance c) Shall facilitate recirculation of the couplant water	Yes / No / Explain		
37	24) Automated calibration of the system	Automated laser tracker-based error mapping with automated report generation shall be provided. Customer shall be able to input the error values in the error compensation software for necessary correction.	Yes / No / Explain		

38	25) Universal part clamping fixture	<p>The part clamping fixtures shall be designed catering to the typical part configurations (maximum weight: 200kg) given in Section: 3 of this document. It shall have following features:</p> <ul style="list-style-type: none"> a) Powder coated steel/extruded Aluminium frame b) Proven concept c) Flexible & modular design d) Short adaption time e) No/minimum tool requirement f) Hand wheel adjustment in X-direction g) Reproducible positioning h) Repetitive accuracy - to be specified 	Yes / No / Explain		
39	6.2 Ultrasonic (Air Coupled)		-		
40	1) Inspection Techniques	Air coupled TTU and pitch catch	Yes / No / Explain		
41	2) Pulser-receiver (UT electronics)	<p>Shall be from the standard manufacturers such as SonoTec, Hillger NDT GmbH, ACS, RITEC or C-scan supplier's own make with proven utility in automated C-scan system.</p> <p>Note: Any other equivalent brand will be considered only based on the acceptance of the test results on the specimen supplied by VSSC</p>	Yes / No / Explain		
42	3) Data acquisition	<ul style="list-style-type: none"> a) Automated data acquisition in TTU and pitch catch modes (amplitude, time of flight & energy) b) Full waveform capture for the above modes 	Yes / No / Explain		

43	4) Gain range	80 dB or better	Yes / No / Explain		
44	5) Dynamic Range	80 dB or better	Yes / No / Explain		
45	6) Pulser Type	Unipolar or Bipolar square/rectangular wave or Burst	Yes / No / Explain		
46	7) Pulser Voltage	Up to 400 V or better	Yes / No / Explain		
47	8) A/D sampling rate(Nominal)	20 MSPS, 14 bits or better	Yes / No / Explain		
48	9) Pulse repetition frequency	Minimum 500 Hz	Yes / No / Explain		
49	10) Frequency Range	50 KHz to 500 KHz or better	Yes / No / Explain		
50	11) Nominal frequency of transducers to be supplied along with the system	a) 50 (\pm 25) KHz – 1 Set b) 125 (\pm 25) KHz – 2 Sets c) 225 (\pm 25) KHz – 2 Sets d) 350 (\pm 50) KHz – 2 Sets 1 set consists of 1 pulser & 1 receiver	Yes / No / Explain		
51	12) Calibration certificate for the transducers	to be provided as per ASTM or ISO equivalent	Yes / No / Explain		
52	6.3 Ultrasonic (Water-Jet)		-		
53	1) Inspection Techniques:	Water jet TTU and PE	Yes / No / Explain		
54	2) Pulser and receiver:	Shall be from the standard manufacturers such as Force Technologies, Isonic, AOS or C-Scan supplier's own make with proven utility in automated C-scan systems. Note: Any other equivalent brand will be considered only based on the acceptance of the test results on the specimen supplied by VSSC.	Yes / No / Explain		
55	3) Pulser Type:	Unipolar or Bipolar square/rectangular wave or Burst	Yes / No / Explain		

56	4) Pulser voltage (Adjustable):	300V or more with a single pulse having variable pulse width OR 2 X 200V or more with Burst pulse having variable pulse width	Yes / No / Explain		
57	5) Frequency range:	1 MHz to 20 MHz or better	Yes / No / Explain		
58	6) Gain range:	95 dB or better	Yes / No / Explain		
59	7) Usable Dynamic range:	90 dB or better	Yes / No / Explain		
60	8) No. of gates:	Min. 4 Nos.	Yes / No / Explain		
61	9) PRF range (adjustable type):	20 to 2000 Hz or higher	Yes / No / Explain		
62	10) A/D sampling rate:	100 MSPS, 14 bits or Better	Yes / No / Explain		
63	11) Frequency filters:	Digital programmable or Hardware filters	Yes / No / Explain		
64	12) Data Acquisition:	a) Automated data acquisition in TTU with provision to capture PE data as well (amplitude, time of flight) for both side of the robotic systems b) PE mode (amplitude, time of flight) c) Full waveform capture for the above modes	Yes / No / Explain		
65	13) Nominal frequency of transducers to be supplied along with the system:	a) 1 MHz- 2 Sets b) 2.25 / 2.5 MHz- 2 Sets c) 5 MHz- 2 Sets d) 10 MHz – 1 Set 1 set consists of 1 pulser & 1 receiver	Yes / No / Explain		
66	14) Dual frequency transducer:	2.25 MHz and 5 MHz – 1 set	Yes / No / Explain		
67	15) Water jet Nozzle Diameter:	a) Ø 6mm – 12 pairs b) Ø 4mm – 6 Pairs c) Ø 8mm – 6 pairs	Yes / No / Explain		
68	16) Calibration certificate for the transducers:	to be provided as per ASTM E 1065 or EN 12668 or ISO equivalent	Yes / No / Explain		

69	17) Ultrasonic System Calibration setup:	The supplied system should have capability for calibrating water coupling UT instruments according to related standards (As per ASTM E 317 or EN 12668 or ISO equivalent)	Yes / No / Explain		
70	6.4 Ultrasonics (Phased Array Mode)		-		
71	1) Inspection method:-	Water bubbler PAUT	Yes / No / Explain		
72	2) Pulsar-receiver (UT electronics):-	Pulsar-receiver (UT electronics) Shall be from the standard manufacturers such as Eddyfi Technologies, Force Technologies or C-Scan supplier's own make with proven utility in automated C-scan systems Note: Any other equivalent brand will be considered only based on the acceptance of the test results on the specimen supplied by VSSC	Yes / No / Explain		
73	3) Aperture:-	1 to 32 elements or better	Yes / No / Explain		
74	4) Nos. of channels:-	64 minimum	Yes / No / Explain		
75	5) Pulsar Type:-	Unipolar or Bipolar square / rectangular wave or Spike	Yes / No / Explain		
76	6) Pulsar rise / fall time for Unipolar or Bipolar square/ rectangular wave:-	< 15 ns	Yes / No / Explain		
77	7) Pulse Voltage (Adjustable):-	100 V or better	Yes / No / Explain		
78	8) Pulse width:-	20 to 100 ns or better	Yes / No / Explain		
79	9) PRF range (adjustable type):-	10KHz or better	Yes / No / Explain		
80	10) Frequency range:-	1 MHz to 20 MHz or better	Yes / No / Explain		

81	11) Gain Range:-	80 dB or better	Yes / No / Explain		
82	12) Dynamic range:-	40 dB or better	Yes / No / Explain		
83	13) No. of gates:-	4 or more	Yes / No / Explain		
84	14) A/D sampling rate:-	50 MSPS with 20 bits OR 100 MSPS with 12 bits OR better	Yes / No / Explain		
85	15) Data acquisition:-	a) Automated data acquisition in PE(amplitude, time of flight) b) Full waveform capture	Yes / No / Explain		
86	16) Signal modes:-	RF, True Envelope and Rectified	Yes / No / Explain		
87	17) Frequency filters:-	Digital programmable or Hardware filters	Yes / No / Explain		
88	18) Nominal frequency of the transducers/Array Probes to be supplied along with the System:-	a) 1.5 MHz: 32 elements (1 No.) b) 2.25/2.5 MHz: 32 elements (1 No.) c) 5 MHz: 16 elements (1 No.) d) 5 MHz: 64 elements (1 No.) e) 7.5 MHz: 64 elements (1 No.)	Yes / No / Explain		
89	19) Probe & Accessories for testing hat-stiffener section (crown & webs) in test parts:-	Stringer bubbler tool mechanism and probes of 5 MHz & 7.5 MHz frequency with appropriate nos. of elements with necessary attachment to enable positive contact of PAUT probes while testing webs and crown of hat-stiffeners.	Yes / No / Explain		
90	20) Acceptance of Phased Array Pulsar receiver:-	Linear/angular resolution, focusing ability and beam steering capability of the PAUT Pulsar receiver shall be demonstrated in accordance with ASTM E2491.	Yes / No / Explain		

91	6.5 Water management:	<p>1) The water management System shall be a closed loop system providing laminar couplant flow to the end effector tooling and shall consist of all necessary valves, pipes, pumps, filters and a storage tank of minimum 2000 litres. Each end effector tool shall have water supply through its own water supply plumbing, automated flow control and flow meter. Water flow rate at the end effector must be kept constant automatically on both sides in spite of differential height, positions and orientations of feed system.</p> <p>The following components shall be included in the water management system:</p> <ul style="list-style-type: none"> • Dual zone cartridge filters for continuous operation • UV lamp for bacterial control • Couplant flow control for each end effector • Remote I/O operation • Level sensor with automated refill • Optical level control (tube) • Multistage return line filtration • Sand filter with flush back function for dust removal <p>2. Water column sustainability: The entire scan envelope shall have the uniform water flow rate. Water path shall have a laminar flow without drooping</p>	Yes / No / Explain		
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at 50mm nominal water path distance or more, on either side of the component for ultrasonic testing using water jet technique.

3. Automatic water flow control of water circulation shall be provided to minimize the dB (i.e. uniformity) variation while scanning by incorporation of appropriate sensors.

4. Water path shall be computer controlled to minimize the time to get correct water path with probe change.

5. Curtains shall be provided around the scan envelope to prevent water splashing. Any kind of splashed water should not come out of scanning envelop area.

6. Water system shall ensure water delivery without air bubbles and facility to minimize the splashing during scan.

7. Proper water management system with automated water regulation for bubbler PAUT shall be provided. Full details of the water management system shall be provided.

92	6.6 Computer and Accessories:	<p>1. Industrial grade personal computer for on-line scanning and data acquisition:</p> <ul style="list-style-type: none"> a. Processor- Intel i7 or higher (latest generation) b. RAM- 64 GB c. Hard disk- 4TB SSD (minimum) d. Display card- with 12 GB memory e. Display monitor – High definition 40 inch (or better) dual monitor with supporting SMPS, keyboard and mouse with the latest advanced configuration f. Network Attached Storage (NAS) Device shall be provided. <ul style="list-style-type: none"> - Processor speed: 1.7 GHz or better - Standard memory: 8 GB - Total hard drive capacity: 16 TB - Interfaces: Gigabit Ethernet & USB 3.0 ports minimum <p>2. PC for post-processing and analysis:</p> <ul style="list-style-type: none"> a. Processor- Intel i7 or higher (latest generation) b. RAM- 64 GB c. Hard disk- 4TB SSD (minimum) d. Display card- with 12GB memory e. Display monitor- High definition 55inches (or better) with supporting SMPS, keyboard and mouse. (or with the advanced/ latest configuration) <p>3. Color laser printer (copier, scanner): Heavy duty, minimum speed 20 copies per minute.</p>	Yes / No / Explain		
93	6.7 Software Requirements:		-		

94	1. General		-		
95	1a)	<p>Software suite shall integrate all the necessary functionalities of the system to complete the entire inspection process with the necessary modules. Operator friendly GUI shall be configured & provided.</p> <p>Pre-processing modules for planning, UT calibration, part geometry capturing and processing, import of part geometry from CAD files, inspection programming, generation of part program for dual robotic motion control including parameters for motion control, ultrasonics, water management & all auxiliary systems</p> <p>Program execution modules for execution of the scan as per the part program, ultrasonic data acquisition, position tagging & storage</p> <p>Post processing modules for evaluation of the acquired ultrasonic & position data, defect identification, mapping & marking and reporting of results.</p>	Yes / No / Explain		
96	1b)	<p>It shall allow the operator to specify/adjust all the parameters needed to define, configure and carry out the inspection.</p>	Yes / No / Explain		

97	1c)	It shall facilitate storage of all data needed for the inspection in a data base. All the modules shall share the same data.	Yes / No / Explain		
98	1d)	Planning module shall collect and store all the information about the component to be tested such as: Project information, Part name & ID, Part geometries, Inspection plan etc.	Yes / No / Explain		
99	1e)	All software package provided shall be compatible with latest generation windows operating system.	Yes / No / Explain		
100	1f)	All software packages shall be part of original equipment.	Yes / No / Explain		
101	1g)	The software upgrades if available shall be provided at no cost for a period of 5 years after the supply.	Yes / No / Explain		
102	1h)	Perpetual license shall be provided for all software supplied.	Yes / No / Explain		
103	1i)	All backup software's shall be provided in DVD / USB hard drives.	Yes / No / Explain		
104	1j)	3-D simulation of machine movement with the component in place shall be provided to avoid possibility of any physical collision with the component and within the system parts itself.	Yes / No / Explain		
105	2. Automated probe alignment verification in TTU mode	Alignment of probes in the TTU mode shall be done automatically to ensure more than 80 % of Full Screen Height (FSH) of UT signal with minimum gain before starting a scan.	Yes / No / Explain		

106	3. Calibration		-		
107	3a)	Calibration module shall allow the user to select the ultrasonic signals and perform calibrations of time (sound path) and signal amplitude using reference signals from standard or reference parts. The user shall be allowed to carry out this operation with real-time display of the signals.	Yes / No / Explain		
108	3b)	All the parameters established during the calibration process shall be saved in a file and provision to recall during both the acquisition process and subsequent calibrations.	Yes / No / Explain		
109	3c)	It shall have features to configure the following: channel management, pulser/receiver, A/D conversion, gates, filters, TCG, focal laws, saturation alarm, back-wall echo synchronized gates, reference curve dB/mm.	Yes / No / Explain		
110	3d)	Probe calibration module	Yes / No / Explain		
111	4. Data acquisition		-		
112	4a)	Full 3D acquisition so that correlation to the position on part is ensured.	Yes / No / Explain		

113	4b)	Ultrasonic tools: frequency analysis (FFT), interface gate monitoring, dynamic echo.	Yes / No / Explain		
114	4c)	Software shall have tools to import CAD files to generate scan program/part program.	Yes / No / Explain		
115	4d)	Ultrasonic setup details are to be stored in scan file which shall be recalled by the operator at a later date along with motion control parameters. The part program stored in the system's memory shall be available for repetitive scan.	Yes / No / Explain		
116	4e)	If the scan is interrupted / stopped either by pausing or due to power failure, the system should be able continue the scan from the point where it was stopped, without the loss of data.	Yes / No / Explain		
117	4f)	Front wall, back wall tracking option shall be provided in pulse echo mode of scanning.	Yes / No / Explain		
118	4g)	Multiple files to be allowed to be opened and evaluated at the same time, with synchronized cursors.	Yes / No / Explain		
119	4h)	Curvature compensation algorithms for curved parts are preferable.	Yes / No / Explain		

120	5. Post processing		-		
121	5a)	Parameters to be evaluated such as: attenuation, distance, time of flight, etc.	Yes / No / Explain		
122	5b)	Defect marking and measurements on scan images: Tools for marking indications: line, angle, point, text; Measurements: length, angle; Data base storage of evaluated areas for report generation.	Yes / No / Explain		
123	5c)	Automatic report generation	Yes / No / Explain		
124	5d)	The following tools shall be provided for the operator to position the probe anywhere in the scan envelope selectable in the C-scan image without touching the part for verifying the data. i. Go-to-point ii. Re-test iii. Defect marking	Yes / No / Explain		

125	5e)	<p>Evaluation tools:</p> <ul style="list-style-type: none"> i. Automatic defect sizing ii. Statistical analysis of area. iii. Position tool with information display for each pixel iv. Histogram analysis v. Conversion from linear to logarithmic scale without any data loss and vice versa. vi. SNR calculation tools vii. Size correction for indications inside radius area: to be specified 	Yes / No / Explain		
126	5f)	<p>Post-scan software edit for full A-scan acquired data: TCG, gates, gain, velocity of sound</p>	Yes / No / Explain		
127	5g)	<p>Automatic analysis thickness mapping tool to identify thickness variation in the TOF C-scan. Features to compare measured TOF C-scan and calibrated UT sound or the design value that is entered in the tool is preferable</p>	Yes / No / Explain		

128	5h)	Porosity measurement tools: i. Tool to identify automatically region of porosity in a part based on established criteria. ii. Automatic analysis tool that shall detect and group discordant values in an image. iii. To detect the pixels of the image that exceeds the threshold value. Provision to ignore those groups whose area is smaller than the specified one. Provision to join those groups of defects whose distances are less than the specified distance.	Yes / No / Explain		
129	5i)	Saving the region of interest image with C-scan data from the full image C-scan data	Yes / No / Explain		
130	5j)	Comparison of different parts scanned at different times: to be specified	Yes / No / Explain		
131	5k)	Image stitching features to combine the multiple c-scan images shall be provided.	Yes / No / Explain		
132	6. Display of post processed data		-		
133	6a)	A, B, C and any other views in amplitude and sound path.	Yes / No / Explain		
134	6b)	Overlay of UT data (C-scan) on CAD model / 3D model	Yes / No / Explain		

135	6c)	Simultaneous display of multiple A Scan, B Scan and C Scan or combinations of two or more scan data on screen for comparative study.	Yes / No / Explain		
136	6d)	Configurable layout of UT views	Yes / No / Explain		
137	6e)	Color palette: up to 256 Color and shades of grey. Discrete and continuous.	Yes / No / Explain		
138	6f)	Scaling and zoom	Yes / No / Explain		
139	7. Storage and Reports		-		
140	7a)	Printing: color and scales of grey equivalent to those on screen, real size (1:1) printing	Yes / No / Explain		
141	7b)	Exporting: i. Images: PNG, TIFF ii. C-scan data for customised post processing	Yes / No / Explain		
142	7c)	Reports: automatic generation of MS Word and PDF reports including images and data. User-configurable templates for MS Word reports	Yes / No / Explain		
143	7d)	Backup: User configurable automatic copy of data files after inspection	Yes / No / Explain		
144	7) System evaluation		-		

145	7.1) Scanning uniformity test on defect free 3D part within the entire scanning area in TTU mode	shall be demonstrated for both air & water jet coupling. Uniformity shall be within 2.0 dB over 95% area without application of any filters. (Supplier can use a "Plexiglass/ Perspex" plate for demonstrating the uniformity).	Yes / No / Explain		
146	7.2) The defect sizes that system must detect on flat parts as given below :		-		
147	7.2a) In Water-Jet P/E and water bubbler PAUT Testing Mode:	Monolithic Construction (attached separately as figure 3b) with minimum size of defects : 5mm x 5mm (Nominal) to be detected with 250 mm/s Nominal Scanning speed.	Yes / No / Explain		
148	7.2b) In Water-jet TTU Testing Mode:	Sandwich Construction (attached separately as figure 3a) with minimum size of defects : 10mm x 10mm (Nominal) to be detected with 1000 mm/s nominal Scanning speed for flat component.	Yes / No / Explain		
149	7.2c) In Air Coupled TTU Testing Mode:	Sandwich Construction (attached separately as figure 3a) with minimum size of defects : 15mm x 15mm (Nominal) & Monolithic Construction (attached separately as figure 3b) with minimum size of defects : 10mm x 10mm (Nominal) to be detected with nominal 250 mm/s Scanning speed.	Yes / No / Explain		

150	Note:	Scanning on the specimens shall be planned such that the defects inbuilt in the specimens get detected at the scanning speed specified above.	Yes / No / Explain		
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151	8) Safety requirements	<p>1. The two sides of the scanner area shall be surrounded by hard fence and remaining one side shall be with photo-electric cell mechanism – so called photo-electrical fence. During part scanning operations, an "intrusion" into the scan area shall activate these modules and thereby the scanner will commence into "emergency stop" mode and the motion will be stopped.</p> <p>2. Emergency stop buttons shall be located at 4 corners of the manipulator. An emergency stop to be provided through scan computer (operator console) and HMI provided near the manipulator.</p> <p>3. Appropriate sensor(s) shall be a provided to prevent collision of probe with the inspection parts.</p> <p>4. To ensure fail-safe operation of the system, all the axes shall have electrical limit switches, mechanical limit switches and mechanical stoppers.</p> <p>5. Fail safe braking of motors</p> <p>6. 3-D simulation of machine movement with the component in place shall be provided to avoid possibility of any physical collision with the component and within the system parts itself.</p> <p>7. IP cameras shall be provided at a suitable line of sight</p>	Yes / No / Explain		
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		<p>for inspection area. The image from the camera shall be presented on additional monitor on the operator desk.</p> <p>8. High power and low power cables, control panel and other major items shall be "Rodent Proof" and in conformance with relevant safety standard.</p> <p>9. The system shall be capable to run continuously for minimum 16 hours per day without failure.</p>			
152	9) Vendor Selection Criteria:		-		
153	9A)	Offer shall be from C-scan system supplier only.	Yes / No / Explain		
154	9B)	<p>The parties who have supplied at least two similar systems (Automated Dual Robotic Based Ultrasonic C-scan system with at least two modes of testing specified in this tender document) and which are working in an aerospace composite production environment satisfactorily only will be considered for evaluation.</p> <p>Testimonials shall be provided for the same.</p>	Yes / No / Explain		

155	9C)	Parties shall provide the list of customers to whom similar equipment under offer including the probe positioning system, motion control, electronics & ultrasonics as an integral unit has been supplied. They shall provide detailed addresses of customers along with contact person's details.	Yes / No / Explain		
156	9D)	Detailed compliance statements with supporting document shall be provided in the bid (mere yes/compliance or no/not compliance will not be considered).	Yes / No / Explain		

157	9E)	<ul style="list-style-type: none"> • As part of techno-commercial evaluation, parties need to present the detailed features and layout of the automated ultrasonic C-scan system, make and features of all sub-systems, material of construction, and compliance with specifications in full; to a Technical Evaluation Committee. Based on the compliance, presentation and clarifications if any, parties will be short listed for further processing. • If the committee finds it necessary, the parties may be asked for demonstration of defect detectability on reference specimens supplied by VSSC. The specimens shall be collected by the party from CMSE stores. No charges shall be paid by VSSC for the specimen evaluation. 	Yes / No / Explain		
158	10) System Acceptance Criteria:		-		

159	10.1) Design Phase:	<p>After order placement, party shall present detailed design and layout of the automated ultrasonic c-scan system, make and features of all sub-systems, material of construction. Fabrication and assembly of the system shall start only after getting overall design approval from VSSC. It is the responsibility of the party to make proper design and realise the entire system to meet the end requirements. The 3D footprint of the machine elements and its assembly shall be shared as part of machine design, and the same shall be used during mutual discussions. The finalised model shall be finally provided in standard 3D CAD formats.</p>	Yes / No / Explain		
160	10.2) Pre-Delivery Inspection at party's site:	<p>The pre-delivery inspection shall be carried out at party's site in fully operational configuration.</p>	Yes / No / Explain		
161	10.2A)	<p>Demonstration of all features and functional requirements as per purchase order specifications shall be done by the party. Full compliance of the system with the purchase order specifications is the criteria.</p>	Yes / No / Explain		
162	10.2B)	<p>Evaluation of Air-coupled Ultrasonic System</p>	Yes / No / Explain		

163	i. Specimen evaluation and detection by air coupled TTU	<p>1. CFRP Sandwich specimen (attached separately as figure 3a) with debond b/w core and skin, delamination & inclusion with in skin, core crush for evaluation of detectability of defects. Minimum detection of delamination, debond and core crush of sizes 15mm x 15mm or dia. 15 mm shall be ensured.</p> <p>2. Laminated specimen (attached separately as figure 3b) for sensitivity evaluation. Minimum detection of defects of sizes 10mm x 10mm or dia. 10mm shall be ensured.</p>	Yes / No / Explain		
164	10.2C)	Evaluation of Water-jet Ultrasonic System	Yes / No / Explain		
165	i. Resolution evaluation for Pulser receiver	<p>With reference to the ASTM E317 Resolution Block, Fig. 6; (attached separately as figure 4a). All the FBH shall be resolved. [As per Std. "A hole is considered to be resolved under these conditions if its indication is clearly separated from the adjacent interface indication down to at least 20 % fs and there are no residual indications greater than 20 % fs throughout the test region when the search unit is repositioned to eliminate the test hole signal."]</p>	Yes / No / Explain		

166	ii. Sensitivity and Noise evaluation for Pulser receiver	With reference to the Area/Amplitude set of Al alloy Std. reference blocks (attached separately as figure 4b) meeting the requirements of Practice ASTM E127, FBH of 1/64 to 8/64 inch dia. shall be detected. [As per Std. a FBH is considered to be detected when "An indication having an amplitude of at least 60 % fs and baseline noise in the test region of no more than 20 % fs"]	Yes / No / Explain		
167	iii. Specimen evaluation and detection by water jet TTU &PE	Stepped laminate (Max. thickness: 8 mm) (attached separately as figure 4a) with grooves and flat bottom holes (provided by VSSC) for sensitivity evaluation. All the FBH of dia. 5 mm or more and 3 nos. of grooves of sizes 2mm x 20mm separated by 2mm shall be detected and resolved.	Yes / No / Explain		
168	10.2D)	Evaluation of Phased Array Ultrasonic System:	Yes / No / Explain		
169	i. Linear/angular resolution, focusing ability and beam steering capability	Linear/angular resolution, focusing ability and beam steering capability of the PAUT Pulser receiver shall be demonstrated on ASTM E2491 PA Assessment Block (attached separately as figure 5a).	Yes / No / Explain		

170	ii. Specimen evaluation and detection by water bubbler PAUT	<p>1. Stepped laminate (attached separately as figure 4c). All the FBH of dia. 5 mm or more and 3 nos. of grooves of sizes 2mm x 20mm separated by 2mm shall be detected and resolved.</p> <p>2. Hat stiffened specimen (attached separately as figure 5b) with delamination, inclusion and FBH for sensitivity evaluation. All defects of sizes 5mm x 5mm or dia. 5mm and more shall be detected and resolved.</p>	Yes / No / Explain		
171	10.2E)	System evaluation	Yes / No / Explain		
172	10.2E1)	Scanning uniformity test on defect free 3D part within the entire scanning area in TTU mode shall be demonstrated for both air & water jet coupling. Uniformity shall be within 2.0 dB over 95% area without application of any filters. (Supplier can use a "Plexiglass/ Perspex" plate for demonstrating the uniformity).	Yes / No / Explain		
173	10.2E2)	The defect sizes that system must detect on flat parts as given below :	Yes / No / Explain		
174	10.2E2a)	In Water-Jet P/E and water bubbler PAUT Testing Mode: Monolithic Construction (attached separately as figure 3b) with minimum size of defects : 5mm x 5mm (Nominal) to be detected with 250 mm/s Nominal Scanning speed.	Yes / No / Explain		

175	10.2E2b)	In Water-jet TTU Testing Mode: Sandwich Construction (attached separately as figure 3a) with minimum size of defects : 10mm x 10mm (Nominal) to be detected with 1000 mm/s nominal Scanning speed for flat component.	Yes / No / Explain		
176	10.2E2c)	In Air Coupled TTU Testing Mode: Sandwich Construction (attached separately as figure 3a) with minimum size of defects : 15mm x 15mm (Nominal) & Monolithic Construction (attached separately as figure 3b) with minimum size of defects : 10mm x 10mm (Nominal) to be detected with nominal 250 mm/s Scanning speed.	Yes / No / Explain		
177	Note:-	Scanning on the specimens shall be planned such that the defects inbuilt in the specimens get detected at the scanning speed specified above.	Yes / No / Explain		
178	10.2E3)	CAD models shall be generated for the part configurations shown in (attached separately as figure 6a, 6b & 6c) using non-contact Laser /optical / structured light camera end-effectors. Generation of scan path shall be done using the above generated CAD models. Defect detectability shall be demonstrated.	Yes / No / Explain		

179	10.2E4)	Functionality of automatic tool changer and automatic defects marker shall be demonstrated with minimum time lag.	Yes / No / Explain		
180	10.2E5)	Reliability run shall be performed with the system operating in dual robotic mode for a continuous period of 20 hours. The part program for this shall include activation of all axes in the full working envelope. Interruption / stoppage in this duration is not permissible. If interruption occurs, the run shall be repeated for the full duration of 20 hours.	Yes / No / Explain		
181	10.2E6)	Verification of the list of deliverables as per purchase order specifications.	Yes / No / Explain		
182	10.2E7)	All the Software features mentioned in the indent document shall be demonstrated.	Yes / No / Explain		
183	10.3) Installation and commissioning	shall be carried out by the party on turn-key basis at CMSE, VSSC. All the pre-dispatch evaluation tests and results shall be repeated. The full-scale mutually agreed parts shall be tested satisfactorily showing the full capability of the system. Also, all features and functional requirements of the integrated system shall be demonstrated in compliance with purchase order specifications in full.	Yes / No / Explain		

184	11) Training:	<p>1. Minimum two-weeks training on all the features of the system shall be imparted to VSSC personnel at CMSE, VSSC, Vattiyoorkavu, Trivandrum, Kerala, India.</p> <p>2. Training shall be provided on all aspects of system operation and maintenance including the following:</p> <p>1. Operator training shall include:</p> <p>a) guidance on all functions of the machine and operating software</p> <p>b) general description of the machine construction and motion</p> <p>c) general description of the supplied ultrasonic systems</p> <p>d) routine start-up operations</p> <p>e) scanning parts using pre-existing scan plans</p> <p>f) scanning parts using Laser/ optical / structured light camera end-effectors</p> <p>g) set-up of scan plans from CAD model</p> <p>h) set-up of scan plans by teach and learn</p> <p>i) set-up & part programme generation for non-uniform thick parts in PAUT mode</p> <p>j) description of ultrasonic variables with respect to the supplied system</p> <p>k) selection of gates for amplitude and time of flight</p> <p>l) image processing and measurement</p>	Yes / No / Explain		
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functions
 m) image processing
 tool options
 n) full waveform
 capture and
 processing
 o) routine operator
 maintenance
 p) fault diagnosis &
 corrections
 q) automated
 calibration of the
 system
 II. Maintenance
 training on all
 aspects including the
 following:
 a) system
 mechanisms
 b) full layouts and
 schematics including
 electronics, electrical
 & mechanical
 c) boards and
 controls
 d) software features
 with PLC diagnostics
 e) routine
 maintenance,
 lubrication and
 servicing of
 mechanical parts
 f) routine
 maintenance and
 servicing for
 electronics &
 electrical
 g) fault finding &
 corrections [
 Diagnosis:- error
 messages &
 explanation]
 h) Recalibration of
 entire system

185	12) Delivery Schedules:	<p>The offer shall clearly indicate the delivery schedule for the following milestones from the date of receipt of order.</p> <p>a) T0: Receipt and acknowledgement of the purchase order.</p> <p>b) T1: Submission of design for review and acceptance by VSSC.</p> <p>c) T2: Design clearance by VSSC</p> <p>d) T3: Readiness of components and sub-systems.</p> <p>e) T4: Pre-dispatch inspection at the party's site.</p> <p>f) T5: Installation, Commissioning & Training at CMSE, VSSC, Vattiyookavu, Trivandrum, Kerala, India.</p> <p>The party shall mention the duration of T1 with respect to T0 and T3, T4 & T5 with respect to T2.</p>	Yes / No / Explain		
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186	13) Electrical Requirements:	<p>a) The line voltage is 415V \pm 10%, 3 Phase, 50 Hz supply. The system should be protected against voltage fluctuation, spikes and frequent power interruption with suitable SCVS (Servo control voltage stabilizer) with noise cutoff ultra-isolation transformer.</p> <p>b) All electrical and electronic systems should be in a cabinet with built-in air conditioner.</p> <p>c) All the electrical / electronic components (other than the OEM control system) shall be of reputed make like Siemens/ABB/L&T/Schneider.</p> <p>d) Necessary electrical layout requirement shall be furnished by the party. The layout shall be in conformance with the standards in vogue. The appropriate insulation class shall be followed.</p> <p>e) The cabling plan & routing shall be through cable trays, drag chains / conduits and shall be well tagged as per standards in vogue.</p> <p>f) Special earthing requirements if any, shall be intimated to VSSC along with full foundation details.</p> <p>g) UPS power requirement for the total machine to be provided.</p> <p>h) Total power requirement for the entire system shall be provided.</p>	Yes / No / Explain		
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187	14) Warranty and Annual Maintenance Contract:	<p>1. Warranty shall be provided by System supplier.</p> <p>2. System must be warranted for trouble free service for a period of two years from the date of successful installation, commissioning and acceptance at VSSC, Vattiyookavu, Trivandrum, Kerala, India.</p> <p>3. Post- warranty AMC (Non-Comprehensive) including two Preventive Maintenance visits per year and any number of break-down calls shall be quoted for at least three years. Essential spares with list and price breakup shall be quoted separately for trouble free operation of C-scan system for at least five years.</p> <p>4. Consumable spares (free of cost) shall be provided to ensure the trouble-free operation during warranty period.</p> <p>5. Party shall agree to provide AMC and spares support for the system for a minimum period of 10 years.</p> <p>6. The vendor from abroad shall have a local representative.</p> <p>7. The software upgrade if available shall be provided at free of cost for a period of 5 years after the supply.</p> <p>8. All necessary tools shall be supplied for operation and maintenance of the system.</p>	Yes / No / Explain		
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188	15) Documents:	<p>Detailed manuals and drawings pertaining to all the aspects of system electronics, controls, transducers, mechanical hardware for general maintenance, troubleshooting etc., shall be provided in English language. Back up copy of the entire system software shall be provided in USB/HD. Complete documentation shall include the following:</p> <ul style="list-style-type: none"> a) Description of system and sub-assemblies b) Operating procedure for routine scanning c) Operating procedure for teach and learn functions d) Software manual e) Routine maintenance instructions f) Mechanical assembly drawings g) Foundation details and drawings h) Recommended spare parts list i) Electrical wiring schematics j) Electronics circuit schematics k) Technical reference manuals for standard modules l) Back-up CDs/ DVDs for the system software. m) Recalibration procedure for the geometrical calibration of the mechanical system 	Yes / No / Explain		

189	16) Other Information :	<p>1. Drawings of civil works requirements including foundation, trenches and associated civil engineering works, and all other requirements for installation and commissioning of the equipment at CMSE, VSSC, Vattiyoorkavu, Trivandrum, Kerala, India, shall be provided at the time of design approval. VSSC shall provide the foundation as per supplier requirement.</p> <p>2. Other infrastructural support if any, shall be intimated to VSSC well in advance.</p> <p>3. The responsibility of unloading the system at CMSE/VSSC site lies with the party.</p>	Yes / No / Explain		
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190	17) Commercial Terms:	<p>1. The parties participating in the tender have to submit their offers in two-parts i.e., Technical & commercial Bid (including price bid with prices masked) and Price Bid separately.</p> <p>2. In part 1- Technical bid, the party has to fill the compliance matrix for all the specifications/requirements. Descriptive statements to be provided, as applicable, in the compliance check list. Relevant proof/supplementary document for the compliances are to be furnished and shall be referenced to the technical bid.</p> <p>3. Technical leaflet/ brochure (in English) and write-up (in English) of the proposed model of the system must be furnished by the party along with the quotation.</p> <p>4. In part 2- Price Bid, detailed system cost break-up shall be furnished as per the format attached.</p> <p>5. Payment will be made only after successful installation, commissioning, performance demonstration, training and acceptance at CMSE, VSSC.</p> <p>6. All other commercial terms as per VSSC norms.</p>	Yes / No / Explain		
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Document : Annexure

Document : Annexure

Document : Annexure

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Document : Annexure

Supporting Documents required from Vendor

- 1. Submit the questionnaire as per annexure 2 along with all the supporting documents**
- 2. Detailed sub-system cost break-up to be provided as per attached format as annexure 3 (Price Bid Related)**
- 3. The percentage of domestic content in the proposed Automated C-scan system shall be submitted with necessary evidences and documents**
- 4. Furnished the details requested in annexure 4 for imported parts or subsystems (Price Bid Related)**
- 5. This is a two-part tender, Technical & Commercial part (Part I) and Price Part (Part II) shall be uploaded separately.**

5 additional documents can be uploaded by the vendor

C.2 Commercial Terms / Bid

Sl. No.	Description	Compliance	Vendor Terms
1	Party is requested to fill and submit the questionnaire requested in annexure 2 along with all the supporting documents	Yes / No / Explain	
2	The percentage of domestic content in the proposed Automated C-scan system shall be submitted with necessary evidences and documents. Also the party is requested to furnished the details requested in annexure 4 for imported parts or subsystems.	Yes / No / Explain	
3	Technical leaflet/brochure (in English) and write-up (in English) of the proposed model of the system must be furnished by the party along with the quotation	Yes / No / Explain	
4	Payment will be made only after successful installation, commissioning, performance demonstration, training and acceptance at CMSE, VSSC	Yes / No / Explain	
5	Warranty	Yes / No / Explain	
6	Training	Yes / No / Explain	
7	Party is requested to submit detailed system cost break-up as per the format attached as annexure 3	Yes / No / Explain	
8	Delivery Period- Please quote stage-wise delivery schedule	Yes / No / Explain	
9	Delivery Terms	Yes / No / Explain	
10	In case of Ex-Works, please indicate packing, forwarding & freight charges up to VSSC, separately	Yes / No / Explain	
11	Liquidated Damage - As detailed in Annexure	Yes / No / Explain	
12	Taxes and Duties if any (Concessional rate applicable for GST)	Yes / No / Explain	
13	Warranty- 2 years	Yes / No / Explain	
14	Performance Bank Guarantee -10% of order value	Yes / No / Explain	

15	Security Deposit (Where ever the offer value is Rs 5.00)-You should submit Security Deposit @10% of order value in the form of insurance Security Bonds, Account Payee Demand Drafts, Fixed Deposit Receipt, Bank Guarantee (Rs.200/- stamp paper) in the prescribed format (DOS:PM:07) from a Nationalized/ Scheduled Bank valid for 2 Months beyond the date of completion of order obligation along with order acknowledgement. Documentary proof of Online payment also acceptable as Security Deposit. This security deposit without any interest thereon shall be returned to the Supplier on successful completion of the Purchase Order or shall be adjusted/forfeited against non-fulfillment of any of the contractual obligations.	Yes / No / Explain	
16	Port of Despatch & Mode of despatch	Yes / No / Explain	
17	Quote Validity : Minimum 90 days [for Single Part Tender]	Yes / No / Explain	
18	Name and Address to Which order to be placed. Please include contact details like mobile no. and email id	Yes / No / Explain	
19	Any other conditions	Yes / No / Explain	
20	Please confirm whether you can comply with all the technical specification as states in Annexures in the tender.	Yes / No / Explain	
21	Percentage of local content as defined under DPIIT Order dtd 04/06/2020- Preference to Make in India Order-2017 Revision	Yes / No / Explain	

C.3 Price Bid

Sl. No.	Item	Quantity	Unit Price	Currency	Total Price	Remark
1	Automated multi-axis multi-mode Ultrasonic C-Scan System	1.00 Sets		-		

Common charges (Applicable for all items)

P&F (Amount)	
Freight (Amount)	
Discount (Amount)	
Any Other Charges (Amount)	