

वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्
Council of Scientific & Industrial Research
राष्ट्रीय वांतरिक्ष प्रयोगशालाएं
National Aerospace Laboratories



CSIR - NAL Estd. 1959
ISO 9001 : 2015
Certified Organization

INVITATION FOR TENDERS

Tender No. NAL/PUR/FMCD/413/20-Y

Dated: 30/12/2021

CSIR - National Aerospace Laboratories (NAL), Bengaluru, Republic of India, is one of the premier research laboratories under aegis of Council of Scientific and Industrial Research (CSIR), an autonomous body under the Department of Scientific and Industrial Research, Government of India, New Delhi. CSIR-NAL is a Science and Knowledge based Research, Development and Consulting Organisation. It is internationally known for its excellence in Scientific Research in Aerospace Engineering.

The Director, CSIR-NAL invites online quotation for procurement of the following item(s) for day to day research work.

Sl. No.	Description of Item(s)	Unit	Quantity
1	Angle of attack Vane Sensor (1set of 2 Nos) – Aircraft Grade (Please refer annexure for detailed specification)	Set	03

Single / Double Bid	Single	Tender Type	Global
Bid Security (EMD) (in INR)	Bid Security Declaration should be enclosed with quotation	Bid submission end date	27-Jan-2022 10.00 Hrs
Performance Security	3% of Purchase Order Value	Bid opening date	28-Jan-2022 11.00 Hrs

01. Tender Documents may be downloaded from Central Public Procurement Portal <https://www.etenders.gov.in>. Aspiring Bidders' who have not registered in e-procurement can register free of cost before participating through the website <https://www.etenders.gov.in>. Bidders are advised to go through instructions provided at 'Instructions for Online Bid Submission'.
02. Tenderers can access tender documents on the website (for searching in the NIC site <https://www.etenders.gov.in>, kindly go to Tender Search option, select tender type and select 'Council of Scientific and Industrial Research', in organisation tab and select NAL-Bengaluru-CSIR in department type. Thereafter, Click on "Search" button to view all CSIR-NAL, Bengaluru tenders). Select the appropriate tender and fill them with all relevant information and submit the completed tender document online on the website <https://www.etenders.gov.in> as per the schedule given in the next page.


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P B No 1779, HAL Airport Road, Kodihalli, Bengaluru - 560 017, INDIA
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<http://www.nal.res.in>



purchasek@nal.res.in

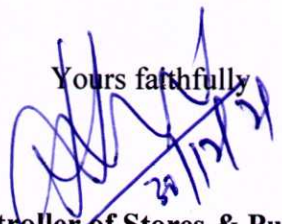


CSIR-National Aerospace Laboratories, Bengaluru-560 017, INDIA

03. Either the Indian Agent on behalf of the Foreign principal or the Foreign principal can bid directly in a tender but **not** both. However, the offer of the Indian Agent should also accompany the authorisation letter from their principal. To maintain sanctity of tendering system, one Indian Agent **cannot** represent two different Foreign principals in one tender.
04. Unsolicited / conditional / unsigned Quotations/Quotations received after the due date and time shall be summarily rejected. The Bidder shall comply the terms and conditions of the tender, failing which, the offer shall be liable for rejection.
05. The bids failing to comply with the following clauses will be summarily rejected.
 - a. The Bidders proposing to supply finished products directly/indirectly from vendors' of countries sharing the land border with India should submit copy of registration done with the Ministry of Home Affairs and Ministry of External Affairs.
 - b. If the products supplied are not from vendors of countries sharing land border with India, the Bidders' have to enclose a declaration to that effect.
06. Bidders are requested to refer to the instructions regarding Procurement Policies for "Make in India", issued by Ministry of Commerce and Industry, Department of Industrial Policy and Promotion dated. 28-May-2018, and 4-Jun-2020 and guidelines as and when issued.
07. The prospective bidders are requested to refer to the Standard Terms and Conditions available on NAL Internet (www.nal.res.in) under the icon Tender-Purchase before formulating and submitting their bids
08. The Director, CSIR- National Aerospace Laboratories, Bengaluru reserves the right to accept any or all the tenders either in part or in full or to split the order without assigning any reasons there for.

Thanking you,

Yours faithfully,


Controller of Stores & Purchase
For and on behalf of CSIR

1. Technical Specifications

SARAS Mk2 is a twin-engine turboprop 19 seater multi role transport aircraft that is being developed by CSIR-NAL.

SARAS Mk2's primary flight control system (PFCS) consists of ailerons, for roll control mounted on the wing, elevators on the horizontal stabilizer for pitch control, and a rudder mounted on the vertical fin for directional control. The PFCS consists of mechanical linkages (cables and push pull rods) connecting the pilot yoke and pedals to each of the respective control surfaces and is reversible. In addition to the primary control surfaces, the aircraft has a trim tab on the elevator, aileron and the rudder for trimming the control forces in the three axes.

SARAS Mk2 aircraft will be equipped with a limited authority Automatic Flight Control System (AFCS) to reduce the pilot workload. SARAS Mk2 AFCS will be designed to be certifiable for IFR and VFR operation and providing landing guidance and control up to CAT II minimum in compliance with FAR Part 23.

Towards the indigenous design and development of the SARAS AFCS the following Line Replaceable Unit (LRU) is required.

SI No.	Item Description	Quantity
1	Angle of attack Vane Sensor (1 set of 2 nos)	3 sets

General Specifications:

1. The above mentioned LRU's shall be aircraft grade with the applicable TSO certifications.
2. The LRU shall be of high reliability and shall preferably have a digital interface, preferable ARINC 429 interface.
3. The software, if any, used shall adhere to RTCA DO-178C standards
4. If possible the vendor shall indicate the aircrafts the quoted LRU's are fitted and certified.
5. This LRU will be installed in SARAS MKII Aircraft with operational envelope of

Altitude : Sea level to 30,000 feet

Speed : upto 250-300 knots, Mach No : less than 0.5

SARAS AFCS computer hosts a Stall Warning module (SW) which has Stall annunciation and Stall prevention functionality. The function of the SW module is to give a reliable and accurate indication of the aircraft Angle of Attack (AOA) and alert the crew members by tactile means of the imminent stall. The major LRU of the SW module is the Angle-of-Attack (AOA) Vane Transducer.


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The specifications for Angle-of-Attack (AOA) Vane Transducers are as follows.

1.1 Angle of attack (AOA) Vane Transducer Specifications

- Shall comply with FAR Part 23 and Part 25 aircraft requirements
- Shall comply with FAA TSO-C54 regulations for use in civil aircraft
- Operating AOA range: atleast ± 50 deg Angle of attack
- • Damping: Max overshoot less than 0.5 degs for a 3 deg displacement input.
- Accuracy: Better than ± 0.25 deg at 100 knots
- Operating temperature range: Typically -55° C to 75° C
- Weight: less than 2 kg
- • Should have both self-regulating Vane heater and case heater
- Case and Vane Heater power supply: 18-32 VDC, nominal 28VDC
- No of potentiometer cups: minimum 3 nos
- Excitation voltage – 30 VDC maximum
- Load Impedance: 100K Ohms Nominal
- Tolerance: 10% of full scale
- Output interface: Potentiometer output/ Synchro/Resolver/RVDT (Desirable ARINC 429 Digital bus interface)
- • Reliability: MTBF > 10,000 hours
- Physical dimensions
 - Vane Base Vane
 - Depth – 2 to 5 inch Thickness – less than 1 inch
 - Width – 2 to 5 inch Width – 2 to 5 inch
 - Length – 2 to 5 inch Length – 2 to 5 inch
- Connector: Case Mounted MIL STD connector
- Total technical life (TTL) > 25 years
- Assurance for maintenance and spares support for the product during the next 25 years
- The Supplier/Vendor shall provide a minimum of 5 years of warranty of the LRU items supplied.
- • The LRU's shall meet the environmental qualifications as detailed in Annexure A. In case of non-compliance this should be part of the technical proposal for evaluation.


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Annexure A

Note: Category "X" represents that corresponding category qualification is not required

Description	RTCA DO-160 Section	Category Requirement	Remarks
Temperature and Altitude	4.0	C4	Operating Low Temperature: -40 deg C Ground Survival Low Temperature: -40 deg C Operating High Temperature: +55 deg C Ground Survival High Temperature: +70 deg C Short Time operating high Temperature: +55 deg C Loss of Cooling: +40 deg C Decompression test – NOT APPLICABLE Overpressure test – NOT APPLICABLE Altitude = 30000 feet
Temperature variation	5.0	B	Rate of change of Temp :5 deg C minimum per minute.
Humidity	6.0	C	
Operation shock and crash safety	7.0	B	Category B (Standard operational shock and crash safety) Operational Shock: 6g and 11ms. 3 shocks in each orientation. Crash Safety (Impulse): 20g and 11ms. 1 shock in each of the six equipment orientations (total 6 shocks). Crash Safety Sustained Test Levels. Up: 3.0g, down: N/A, forward: 18.0, aft: N/A, side (left & right): 4.5g – for fixed orientation OR 18.0 g in all directions for random orientation.
Vibration	8.0	S	Curve L
Explosive Atmosphere	9.0	X	Not applicable
Water Proofness	10.0	R	R
Fluid susceptibility	11.0	X	Not applicable
Sand and Dust	12.0	S	



Fungus Resistance	13.0	F/X	Note: If all materials used in the construction of the equipment can be shown to be non-nutrients for the growth of fungi, either through their composition or through previous testing, this test is not required.
Salt Fog/Salt Spray	14.0	T	
Magnetic Effect	15.0	B	
Power Input	16.0	B/Z	
Voltage Spike	17.0	A	
Audio Frequency and Conducted Susceptibility	18.0	B/Z	
Induced Signal Susceptibility	19.0	Z/ZC/ZCE	Z as per DO-160D ZC/ZCE as per DO-160G Note: E is required only if installation has a non-metallic enclosure
Radio Frequency Susceptibility	20.0	R	
Emission of Radio Frequency Energy	21.0	H	
Lightning Induced Transient Susceptibility	22.0	A3XX/ A3XXXX	A3XX as per DO-160D A3XXXX as per DO-160G
Lightning Direct Effects	23.0	ZZ2A	
Icing	24.0	C	
Electrostatic Discharge	25.0	A	
Fire Flammability	26.0	C	

[Signature]
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BID-SECURING DECLARATION FORM

Date: _____

Bid No. _____

To (insert complete name and address of the purchaser)

I/We. The undersigned, declare that:

I/We understand that, according to your conditions, bids must be supported by a Bid Securing Declaration.

I/We accept that I/We may be disqualified from bidding for any contract with you for a period of one year from the date of notification if I am /We are in a breach of any obligation under the bid conditions, because I/We

(a)	have withdrawn/modified/amended, impairs or derogates from the tender, my/our Bid during the period of bid validity specified in the form of Bid; or
(b)	having been notified of the acceptance of our Bid by the purchaser during the period of bid validity
	(i) fail or refuse to execute the contract, if required, or
	(ii) fail or refuse to furnish the Performance Security, in accordance with the Instructions to Bidders.

I/We understand this Bid Securing Declaration shall cease to be valid if I am/we are not the successful Bidder, upon the earlier of (i) the receipt of your notification of the name of the successful Bidder; or (ii) thirty days after the expiration of the validity of my/our Bid.

Signed: (insert signature of person whose name and capacity are shown)
in the capacity of (insert legal capacity of person signing the Bid Securing Declaration).

Name: (insert complete name of person signing the Bid Securing Declaration)

Duly authorized to sign the bid for an on behalf of: (insert complete name of Bidder)

Dated on _____ day of _____(insert date of signing)

Corporate Seal (where appropriate)

Note:

1. In case of a Joint Venture, the Bid Securing Declaration must be in the name of all partners to the Joint Venture that submits the bid.
2. Bid Security declaration must be signed in by the Proprietor/CEO/MD or equivalent level of Officer of the company.