

PROCEEDINGS OF THE PRE-BID CONFERENCE HELD ON 05-Feb-2021 AT ICAST CONFERENCE HALL, CSIR-NAL, TOWARDS PROCUREMENT OF ELECTRO MECHANICAL DUAL RAM ACTUATOR FOR RUDDER & ELEVATOR TRIM TAB CONTROL SYSTEMS

The Pre-bid Conference was held and the following T&PC members attended the meeting: -

Sl. No.	Name & Designation		Role
1	Dr. M. Manjuprasad	Chief Scientist, STTD	Chairman
2	Mr. M. V. Shiva Prasad	Principal Scientist, STTD	Specialist Member
3	Dr. C. M. Manjunatha	Chief Scientist-SID	Specialist member
4	Mr. Dilip Kumar Sahu,	Sr. Technical Officer-2, CAD	Member
5	Mr. Satish Rohidekar,R	Chief Scientist, CAD	Member
6	Mr. Vineet Kumar	Chief Scientist, CAD	PD-SARAS Member
7	Dr. Abhay Pashilkar	Chief Scientist, FMCD	Prog- Director Member
8	Mr. Narasimha Rao Balla	Principal Scientist-CAD	Member - Convener (TSC)
9	AO or his representative		Member
10	CoFA or his representative		Member
11	Sr. CoSP/SPO or his representative		Member - Convener (T&PC)


The list of Prospective bidders who attended the Pre-bid Conference is as per **Annexure-I**.

At the outset, the Chairman welcomed all the Members and the representatives of the Bidders and briefed in general the scope of the Project and thereafter requested **SPO** to brief the Bidders on the salient features of the commercial terms. The Indenting Officer to read out the clarification sought by the bidders and the replied thereto as detailed in **Annexure-II (Part A: Technical Clarification and Part B: Commercial Clarification, if any)**.

The representatives present were satisfied with the replies given and it was informed that the corrections / additions / clarifications given, as discussed during the Pre-Bid Conference would be hosted on the website of CSIR-NAL and all prospective bidders are required to take cognizance of the proceedings of the Pre-Bid Conference before formulating and submitting their bids as stipulated in bidding Documents.

The meeting ended with a vote of thanks to the Chair.


Encl: as above.


M. J. Nandeesh
Member - Convener (T&PC)


Sr. CoSP-Member

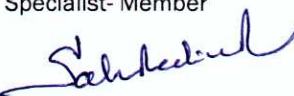

CoFA-Member


Admin - Member



M. V. Shiva Prasad
Specialist- Member


Dr. C. M. Manjunatha
Specialist - Member


Dilip Kumar Sahu
Member


Satish Rohidekar R
Member


Vineet Kumar
PD- SARAS-Member


Narasimha Rao Balla
Member - Convener (TSC)


Dr. Abhay Pashilkar
Proj- Director- Member


Dr. M. Manjuprasad
Chairman


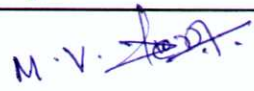
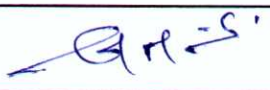

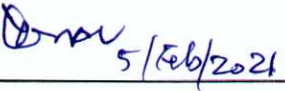


**CSIR-NATIONAL AEROSPACE LABORATORIES
BENGALURU - 560 017**

TENDER NO.: NAL/PUR/CAD/384/20-Z
DATE & TIME : 05-Feb-2021 @ 10.30 AM
VENUE: THROUGH WEBEX

ANNEXURE - I

Pre-Bid Conference for PROCUREMENT OF ELECTRO MECHANICAL DUAL RAM ACTUATOR FOR RUDDER & ELEVATOR TRIM TAB CONTROL SYSTEMS.

ATTENDANCE SHEET - T&PC MEMBERS

Sr. No.	Name		Signature
1	Dr. M. Manjuprasad, Chief Scientist, STTD	Chairman	
2	Mr. M. V Shiva Prasad, Principal Scientist-STTD	Specialist-Member	
3	Dr. C. M. Manjunatha, Chief Scientist, SID	Specialist-Member	
4	Mr. Dilip Kumar Sahu, Sr. Technical Officer-2, CAD	Member	
5	Mr. Satish Rohidekar R, CAD	Member	
6	Dr. Abhay Pashilkar, Chief Scientist, FMCD	Member	
7	Mr. Vineet Kumar, Chief Scientist, CAD	Member	
8	Mr. Narasimha Rao Balla, Principal Scientist, CAD	Member- Convenor - TSC	
9	AO or his representative	Member	
10	CoFA or his representative	Member	
11	Sr. CoSP/SPO or his representative	Member-Convenor T&PC	

**NATIONAL AEROSPACE LABORATORIES
BENGALURU - 560 017**

TENDER NO.: NAL/PUR/CAD/382/20-Z

DATE & TIME : 05-Feb-2021 @ 10:30 AM

VENUE: ICAST Conference Hall, CSIR-NAL, HAL Airport Road, Kodihalli, Bengaluru-560017

ANNEXURE - I

Pre-Bid Conference for PROCUREMENT OF ELECTRO MECHANICAL DUAL RAM ACTUATOR FOR RUDDER & ELEVATOR TRIM TAB CONTROL SYSTEMS.

ATTENDANCE SHEET - PROSPECTIVE BIDDERS

Sr. No.	Name of the Firm	Name & Designation of Representative	E-tender Registration (Yes/No)	Email ID	Signature
1	AMETEK Instruments India Pvt Ltd	Abhinav Kumar Sales Engineer		abhinav.kumar@ametek.com	
2	MICRONEL Global Engineers Pvt Ltd	Mrs. Geeta V Sr. Manager		gg@micronel.net	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					

Chapter 4

Specifications and Allied Technical Details

Requirements and Specifications for Actuator for Rudder and Elevator Trim Tab Control Systems for Saras Mk II Aircraft

4.1 End Use: To be used for Saras Mk II Aircraft

4.2 Specifications:

4.2.1 Requirements:

1	Introduction: The Saras Mk2 aircraft is designed for a commuter role, with a seating capacity of up to 19 with 2 pilots, propelled by twin turbo propeller engines with pressurized cabin with ceiling cruise altitude of 30000 feet. The aircraft is to be certified under FAR 23 certification rules including day, night, VFR, IFR, and flight into known icing conditions. The applicable environmental qualification under DO-160G or higher. It is required to have high reliability, contemporary systems, modern design concepts and technologies. The components/systems will be comparable to current industry standards should be preferably generic (not specific to type) and may be Off- the-Shelf items so that cost remains reasonable. This document contains the details of the requirements and specifications for Actuator for Rudder & Elevator Trim Tab control system.
2	Scope: Supply of Dual Ram actuator for Rudder and Elevator trim tab control systems preferably from the Off –The–Shelf.
3	Type of Actuator: Dual Ram Electro Mechanical to meet the requirement of design given in the FAR 23 with applicable Advisory Circulars

4.2.2 Technical Specification

4	Location of Actuator in the aircraft: Inside Rudder surface for rudder trim tab actuator and inside horizontal tail surface for Elevator trim tab actuator (Non-controlled pressure & Non- controlled Temperature)
5	Applicable Regulatory and Certification Documents: Should meet FAR-23 amendment 23-64 performance-based regulations. The prescriptive provisions within previous latest amendments of FAR-23, where applicable, may be used along with applicable advisory circulars.
6	Electrical System: Aircraft electrical power supply details for electro mechanical actuator operation are as follows: <ul style="list-style-type: none">• Trim actuator shall have a simple bang-ON control• Normal supply for operation: 28 V DC• Voltage range: 18 V to 32.2 V DC• The direction of rotation shall be changeable by swapping of supply

B. Narasimha

	<ul style="list-style-type: none"> • Actuator should be supplied with mating connectors and back shell. • Electrical pin details to be provided by the OEM
7	Rated Load: Not less than 100 Lbs. (45.85 Kgs)
8	Stroke: <ul style="list-style-type: none"> • 40 mm \pm 1 mm preferable • Potentiometer resistance; > 1 kohm • Potentiometer - 4 cups (if possible)
9	Rate of Movement: 2.5 mm to 3 mm per sec at Rated load
10	Physical Dimensions: Length: 225 mm – 245 mm (retracted position) (less than 225 mm preferable) Width: 110 mm – 130 mm (less than 110 mm preferable) Height: 100 mm -110 mm (less than 100mm preferable) Drawing with Mounting details are to be provided by the OEM
11	Operating Temperature Range: - 55°C to +70°C
12	Weight of the Actuator: <ul style="list-style-type: none"> • Weight shall be as much lower as possible and to be provided by the OEM. • Weight range to be in range of 2 Lbs to 5 Lbs.
13	Mechanical Interface <ul style="list-style-type: none"> • Should be equipped with eye end with Spherical bearing. • Spherical bearing is acceptable, bearing bolt diameter should be minimum of 4.8 mm to 6.4 mm.
14	Altitude Requirement: Maximum altitude 30000 feet. (Aircraft maximum ceiling altitude of 30000 feet).
15	Qualification Test Requirements: RTCA-DO-160 G or Higher
16	Shelf Life: Unlimited
17	Time Between Overhaul (TBO): On Condition

B. N. Nair

17	Time Between Overhaul (TBO): On Condition
18	Total Technical Life (TTL): Preferably 30 Years / 75,000 Flight Hours or actual data to be provided by the OEM.
19	Product Support: The supply proposal should include assurance for maintenance and spares support for the product during the next 30 years, the aircraft is expected to be in service. Vendor should ensure all quoted components are fully certified for airworthiness requirements. OEM/Vendor shall provide on-site and off-site product support for technical inputs to certification and ground test, flight test and flight operations activities during the service of aircraft.
20	Qualification Test Compliance: OEM shall ensure, submission of supporting documents/reports for means of compliance of Qualification tests conducted as per RTCA/DO-160 G or higher and means of compliance of Acceptance & Performance Tests shall to be submitted to be by the OEM. Endurance Test documents supporting means of compliance to meet the useful life of 30 years or 75000 flying hours shall to be submitted by the OEM. (Request OEM/Vendor to provide means of compliance of qualification tests details, and means of compliance of Acceptance & Performance Tests and Endurance Test details as part of bid submission).

4.2.3 List of Deliverables:

Sl. No.	Item Description	Unit	Quantity
1.	Dual Ram Electro Mechanical Actuator	No s	14

4.2.4 List of Documentation:

Sl. No.	Item Description
1.	Supply of manuals for LRU level components
2.	LRU level drawings showing all the dimensions, installation/interface drawings with details like fasteners, electrical connectors etc. required for installation on to the aircraft.
3.	Electrical wiring diagrams showing all details of pins and recommendation on using the type of wiring/cable and routing guidelines.
4.	Component level performance data for all flight/load conditions.

B. Nasarimhela

5.	LRU level test schedules to carry out pre installation (PI) checks of all Mechanical, Electrical and Electronic components. Component Maintenance Manuals for all LRUs to be supplied. Recommendation for test rig/bench test facility required to carry out PI checks.
6.	Acceptance test procedure for inspection and acceptance after the receipt of the Components from the Vendor
7.	Components/LRUs Life document: Shelf life, TBO, Service Life etc.
8.	Report/document on Component Level for the following Reliability Analysis (RBA) Failure Hazard Analysis (FHA) Failure Mode Effects and Criticality Analysis (FMECA) Fault Tree Analysis (FTA)
9.	Component/LRU design specification
10.	Qualification test procedures (QTP)
11.	Qualification test report (QTR)
12.	Acceptance test procedure (ATP)
13.	Acceptance test reports (ATR)
14.	COC/FAA Form 8130-3/EASA Form One or Equivalent /CEMILAC/DGCA/DGAQA Approvals
15.	Declaration of Design and Performance (DDP)
16.	Component Maintenance Manual/Operating instructions and first line maintenance instructions
17.	Recommendations for ground support equipment
18.	Spares recommendation list

4.3 Scope of Supply and incidental works:

Scope of Supply includes the following:

- (i) Supply of Off-The-Shelf Actuator as per the Specifications & Requirements along with the accessories as per clause No.4.2
- (ii) Installation, Commissioning and Acceptance as per clause No.4.4.5
- (iii) Training as per clause no.4.5
- (iv) On site comprehensive Warranty as per clause No.4.6.
- (v) Annual Maintenance Contract / Maintenance Support as per clause No.4.7
- (vi) Delivery Schedule as per clause No.4.8.

4.4 Inspection & Tests

4.4.1 General

1. The Supplier shall at its own expense and at no cost to the Purchaser carry out all such tests and/or inspections of the Goods and Related Services as are specified here.

B. Natarajha Rao

2. The inspections and tests may be conducted on the premises of the Supplier or its subcontractor(s), at the point of delivery and/or at the Goods final destination.
3. Whenever the Supplier is ready to carry out any such test and inspection, it shall give a reasonable advance notice, including the place and time, to the Purchaser. The Supplier shall obtain from any relevant third party or manufacturer any necessary permission or consent to enable the Purchaser or its designated representative to attend the test and/or inspection.
4. Should any inspected or tested Goods fail to conform to the specifications, the Purchaser may reject the goods and the Supplier shall either replace the rejected Goods or make alterations necessary to meet specification requirements free of cost to the Purchaser.
5. The Purchaser's right to inspect, test and, where necessary, reject the Goods after the Goods' arrival at final destination shall in no way be limited or waived by reason of the Goods having previously been inspected, tested and passed by the Purchaser or its representative prior to the Goods shipment.
6. The Supplier shall provide the Purchaser with a report of the results of any such test and/or inspection.
7. With a view to ensure that claims on insurance companies, if any, are lodged in time, the bidders and /or the Indian agent, if any, shall be responsible for follow up with their principals for ascertaining the dispatch details and informing the same to the Purchaser and he shall also liaise with the Purchaser to ascertain the arrival of the consignment after customs clearance so that immediately thereafter in his presence the consignment could be opened and the insurance claim be lodged, if required, without any loss of time. Any delay on the part of the bidder/ Indian Agent would be viewed seriously and he shall be directly responsible for any loss sustained by the purchaser on the event of the delay.
8. Before the goods and equipment are taken over by the Purchaser, the Supplier shall supply operation and maintenance Manuals together with Drawings of the goods and equipment built. These shall be in such details as will enable the Purchase to operate, maintain, adjust and repair all parts of the works as stated in the specifications.
9. The Manuals and Drawings shall be in the ruling language (English) and in such form and numbers as stated in the Contract.
10. Unless and otherwise agreed, the goods and equipment shall not be considered to be completed for the purposes of taking over until such Manuals and Drawing have been supplied to the Purchaser.

B. Nalainhereau

11. On successful completion of acceptability test, receipt of deliverables, etc. and after the Purchaser is satisfied with the working of the equipment, the acceptance certificate signed by the Supplier and the representative of the Purchaser will be issued. The date on which such certificate is signed shall be deemed to be the date of successful commissioning of the equipment.

4.4.2 Manufacturer's Inspection Certificate

After the goods are manufactured and assembled, inspection and testing of the goods shall be carried out at the supplier's plant by the supplier, prior to shipment to check whether the goods are in conformity with the technical specifications. Manufacturer's test certificate with data sheet shall be issued to this effect and submitted along with the delivery documents. The purchaser and/or civil aviation authority representative reserves the options to be present at the supplier's premises during such inspection and testing.

4.4.3 Pre Dispatch Inspection (delete if not applicable) or elaborate. ~~(Provision of para 2.2.2 (07) of the CSIR Manual on Procurement of Goods 2018 needs to be considered while framing this clause.)~~

(i)	The bidder will carry out pre-dispatch inspection at manufacturer's location and check for trouble free operation of the system. A separate report on the pre-dispatch inspection has to be provided with the supply of the system.
(ii)	Bidder to prove out all the specifications as outlined in the Chapter 4.
(iii)	Copy of the Inspection, Maintenance and Trouble Shooting manuals to be given to the representatives of CSIR-NAL. Explanation of the same to be done.

4.4.4 Third Party Inspection (delete if not applicable) or elaborate.

As mutually agreed by the Vendor and Purchaser at the appropriate time of inspection.

4.4.5 Installation, Commissioning and Acceptance Test

The acceptance test will be conducted by the Purchaser during the installation at Purchaser's site in the presence of supplier's representative's/suppliers manuals. The acceptance test plan to be approved by both purchaser and supplier. The acceptance will involve trouble free operation. There shall not be any additional charges for carrying out acceptance test. No malfunction, partial or complete failure of any part of the equipment is expected to occur. The Supplier shall maintain necessary log in respect of the result of the test to establish to the entire satisfaction of the Purchaser, the successful completion of the test specified.

On the event of the ordered item failing to pass the acceptance test, a period not

B. Nalaindean

exceeding two weeks will be given to rectify the defects and clear the acceptance test, failing which, the Purchaser reserve the right to get the equipment replaced by the Supplier at no extra cost to the Purchaser.

Successful conduct and conclusion of the acceptance test for the installed goods and equipment shall also be the responsibility and at the cost of the Supplier.

The acceptance tests at the final destination include the following:

a)	Visual Inspection
b)	Room Temperature Functional/Performance Bench Tests
c)	Bonding & Insulation Tests
d)	Pre-Installation Checks
e)	Ground Test on Test Rigs

4.5 Training:

Free training should be imparted to three no. of persons of the purchaser at the purchaser's premises or through video conference for a period of four days on pre-installation checks, installation on test rigs and installation on aircraft, operation, trouble shooting and maintenance of the supplied item. ~~(Provision of para 2.2.2 (07) of the CSIR Manual on Procurement of Goods 2018 needs to be considered while framing this clause.)~~

4.6 Incidental Services

(i) **On site Comprehensive Warranty:**

- **3 Years** from Installation & Commissioning and date of acceptance.
- In case the Equipment remains non-operational for more than **30 days** then warranty period will be extended for the equivalent period for which Equipment remained non-operational. Warranty extension in such case shall be done without prejudice to any other Term & condition of the contract

4.7 Annual Maintenance Contract *(delete if not applicable) or elaborate.*

Not applicable

4.8 Delivery Schedule (including supply, installation, commissioning, training & acceptance)

B. Nandan Rao

Delivery of the Item		Installation & Commissioning		Training At CSIR_NAL or Video Conferencing, if any	Acceptance of the item
Days/ Weeks/Months	Location	Days/ Weeks/ Months from the date of receipt of equipment	Location	Days/ Weeks/Months from the date of Installation & Commissioning	Days/ Weeks/Mont hs from the date of Installation, Commissioni ng & Training
15 months	CSIR-NAL Bengaluru, India	1 Month	CSIR-NAL Bengaluru, India	4 days	1 Month

B. N. Nambiar

Annexure –II PartA

Technical discussion of Pre Bid meeting on Rudder & Elevator Trim tab dual ram actuator dated 05-02-2021

1) Actuator potentiometer resistance:

One of the Bidder asked about the potentiometer resistance of 5 Kohm is acceptable or not?

CSIR –NAL clarification:

Greater than 1 Kohm is acceptable

2) Mechanical Interface:

The bolt diameter mentioned of minimum of 5 mm in chapter 4. One of the bidder asked that the bolt diameter can be from 4.8 mm to 6.4mm. CSIR-NAL clarified that it is acceptable to design.

3) Acceptance Test:

One of the Bidder mentioned that we will not participate in chapter 4.4.5 point (f) Assembly, Functional and Flight testing on aircraft. CSIR –NAL clarified that during Assembly, Functional & Flight testing, if any Technical queries / Technical document required, to be provided by the OEM.

4) Chapter 4 changes/modifications:

- In para 4.2.2 Technical specifications, SI no.6 Electrical system, the following points are added after the discussion with Electrical/ Avionics team.
 - Trim actuator shall have a simple bang-ON control
 - The direction of rotation shall be changeable by swapping of supply
- In para 4.2.2, SI no.8, the changes are incorporated as follows
 - potentiometer resistance > 1 okhm - added
 - Potentiometer 4 cups (if possible) -added
 - ARINC 429 output for position and status –deleted.
- In para 4.2.2, SI no.13, Mechanical Interface, the change incorporates that the bolt diameter can be from 4.8 mm to 6.4 mm.
- In para 4.4.5, Installation, Commission and Acceptance test, the following changes are indicated below.
 - Point(f) -deleted

The above changes/modifications will be updated in chapter 4 and to be communicate to the bidder.

B. N. Nandekar