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**Council of Scientific and Industrial Research
NATIONAL AEROSPACE LABORATORIES**

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Date: 22-Oct-2020

CORRIGENDUM

Tender No. NAL/PUR/ACD/200/20-Z

Tender ID: 2020_CSIR_561841_1 Dated 01-Oct-2020

In continuation of CSIR-National Aerospace Laboratories Tender No. NAL/PUR/ACD/200/20-Z Dated 01-Oct-2020 for "**Design and Engineering of Airframe for SARAS MK2**", the following may be noted by the EOI bidders as mentioned below: -

1. Changes/clarification in the technical/commercial details as per annexure enclosed.
2. Extension of due date of submission

| EXISTING | | | | AMENDED TO | | | |
|----------------------------------|------------|---------------------------------|------------|----------------------------------|------------|---------------------------------|------------|
| Date & Time of Submission of Bid | | Date and Time of Opening of Bid | | Date & Time of Submission of Bid | | Date and Time of Opening of Bid | |
| Date | Time (IST) | Date | Time (IST) | Date | Time (IST) | Date | Time (IST) |
| 29-Oct-2020 | 10:00 Hrs | 29-Oct-2020 | 11:00 Hrs | 03-Nov-2020 | 10:00 Hrs | 03-Nov-2020 | 11:00 Hrs |

Other clauses of the bidding document remain unchanged.


Stores & Purchase Officer
For and on behalf of CSIR

| Sl. No. | Query | CSIR-NAL Clarification |
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| 1 | The EOI mentions that the work needs to be performed in India. XXXX is a multinational company and we plan to do the most work in our India office in Bangalore. If we win the bid, but we need support from our colleagues outside India on certain technical matter. Even though we handle this internally, we want to upfront that we will take help / support outside India with our own companies globally. Let me know if this is ok so that we can consider responding to the EOI. Please note that NAL interface will be with our Bangalore office only. | The successful bidder has to sign NDA for data confidentiality. The vendor can share data with parent company/ subsidiary/ partner company (within India and Outside) with the prior permission of CSIR-NAL while complying to NDA clauses. The vendor should take prior approval of CSIR-NAL on the data that is being shared and the purpose of sharing the data within the framework of work package. It is the sole responsibility of vendor to ensure the compliance of NDA in toto by parent company/subsidiary/ partner company with which the data has been shared. |
| 2 | As per our understanding PDP completion means, we assume that Preliminary Design Review (PDR) is completed and preliminary design is signed off by PDR committee. Please confirm, if our understanding is correct? | Yes, PDP completion means that PDR would be completed and would be signed off by PDR Committee. |
| 3 | It is assumed that NAL has closed all open action items from PDP review, please confirm. | Yes, open action of the PDR committee would be closed before Detail Design Phase (DDP) starts. |
| 4 | Please confirm on how many load loop cycles are planned for the Detail design phase. Is it possible to specify approximate number of iterative load loops to be considered during detail design? | Like other aero OEM, NAL has similar concepts of considering loads in different phases of design. It is to be noted that the detail design phase is evolutionary and iterative in nature. The anticipated load loops may not exceed more than 2 major iterations. |
| 5 | Does NAL has a standard Tolerance stackup analysis methodology which can be used by Engineering Service provider? | The engineering service providers shall follow the Tolerance stackup analysis as per the industry standards in consultation with CSIR-NAL. |
| 6 | Please clarify if Emergency exit door is out-of-work scope for Engineering Service provider | Emergency exit doors, passenger door and cargo doors are not part of this EOI (NAL/PUR/ACD/200/20-Z). |




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| 7 | Regarding the different types of doors (NLG Door, MLG Door, Passenger Entry door, Cargo Door, Emergency Door), XXXX assumes that Door Structure and Mechanism design are completed in the PDP. Please confirm. | The preliminary design for NLG door, MLG door, avionic door, Aft-fuselage service door that are indicated in this EOI (NAL/PUR/ACD/200/20-Z) would be completed in PDR. The design for passenger door, emergency doors, cabin service door, cargo door are not a part of this EOI (NAL/PUR/ACD/200/20-Z). |
| 8 | Is Engineering Service provider are supplied with re-usable Mechanism Design especially for NLG Door, MLG Door, Passenger Entry door, Cargo Door, Emergency Door. Please confirm. | The basic mechanism design would be provided for NLG door, MLG door, avionic door, Aft-fuselage service door. The detail design is the responsibility of the engineering service providers. The design for passenger door, emergency doors, cabin service door, cargo door are not a part of this EOI (NAL/PUR/ACD/200/20-Z). |
| 9 | Since Design need to be carried out concurrently for all the 4 workpackages, we assume NAL to facilitate DMU availability among selected suppliers, please confirm. | All the engineering service providers have to utilise the PLM which would contain the 3D models and permissions in PLM would be provided as necessary. |
| 10 | "The considerations for detail design are as quoted below but not limited to meeting FAR 23 requirements, load requirements, safety factors requirements, weight & C.G. limits, Design For Manufacturing and Assembly (DFMA), tooling requirements, materials & processes, adjoining sections/assembly, system installations, clash and clearances, Interchangeability (ICY) requirements, lower manufacturing cost etc" Please specify will there be any additional requirements, if so this may be treated as scope creep. Is our understanding correct? | Few requirements are indicated as part of the EOI (NAL/PUR/ACD/200/20-Z). Whatever requirements that is required for a good product needs to be met. Few other requirements would be related to maintenance related, corrosion prevention, accessibility, etc. Please note that the work package would be a firm and fixed bid. There is no provision for scope creep. |
| 11 | Is Service Door same as Passenger Entry Door, if different then Passenger Entry Door is out-of the scope in the work packages. Please confirm. | The service door indicated in the EOI (NAL/PUR/ACD/200/20-Z) is the aft fuselage service door for servicing the equipment in rear fuselage. The cabin service door is not part of this EOI (NAL/PUR/ACD/200/20-Z). |




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| 12 | It is specified as "Door surround structure" as part of Centre Fuselage work content, please confirm the Door to which this is being referred. | The door surround structure is to be provided to all the major cutouts and openings for doors in the fuselage to safely carry the loads. In the centre fuselage, the door surround structure is envisaged around the passenger door, emergency doors, cargo door based on local stress analysis. |
| 13 | Project schedule appears very aggressive with multiple requirements (Meeting weight target, kinematics simulation and mechanism development for all moving components -doors, control surfaces, Interface clearance models, minimize manufacturing cost) which being part of the work content, please clarify. | The project schedule is the requirement of the project which needs to be met by the engineering service providers. |
| 14 | Is it part of Engineering Service Provider scope to run the GFEM model for all load cases and arrive at internal loads. If yes, please specify approximate number of critical load cases. | <p>GFEM: No, GFEM for strength and buckling will be CSIR-NAL's responsibility for all load cases.</p> <p>Internal Loads: The engineering service provider should generate the internal loads to carry out the detail sizing of individual components, splices and joints. However, any modifications for local analysis & DFEM are the engineering service provider's responsibility.</p> <p>Critical Load Cases: The approximate number of critical load cases for which CSIR-NAL would carry out GFEM analysis would be as follows: Fuselage - 25, Wing - 25, Horizontal Fin - 5, Vertical Fin - 3, Control Surfaces - 5 each</p> |
| 15 | "CSIR-NAL team would review the methods/approaches proposed by Engineering Service Provider before the formal release of documents". As per this statement, in absence of a unified methodology across 4 work packages, we foresee risk of coming to an agreed methodologies in given aggressive time frame. We propose to adopt NAL provided methodologies. Please confirm. | The engineering service provider is expected to propose and adopt the best industrial practices to meet the objectives of the work package awarded and meeting deliverables in consultation with CSIR-NAL. |

Agree



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| 16 | To proceed with detail design phase, we understand all Key structural / systems interface must have been discussed and frozen during PDP. In this section, it is mentioned that Interface clearance arrangement models is an expected deliverable from Engineering service provider, please clarify, the following 1. Is the preliminary Interface control Model (ICM) is developed during PDP phase for all major interfaces? 2. Is all the preliminary ICMs approved during PDR? | Control models & drawings are different from Interface Clearance Arrangement models and drawings that is requested. The terminology of Interface Control drawings used in industry is related to systems/equipment. Interface Control models and drawings are not part of this EOI (NAL/PUR/ACD/200/20-Z). Interface Clearance Arrangement drawings is clearly explained in the last paragraph of section 6.3 of EOI (NAL/PUR/ACD/200/20-Z). |
| 17 | CSIR-NAL to provide the Interface definition for the each of the sections - Front, center, Rear fuselage, wing, HT and VT, and Control surfaces. | CSIR-NAL will provide the interface definition to the successful bidder after the RFQ process. |
| 18 | Please clarify whether the system brackets (mechanical and electrical) are within the scope of structure design. Kindly confirm if this has been considered as part of the drawing numbers quoted in EOI. | The system brackets (Mechanical and electrical) are within the scope of the structure design. The system Brackets are considered as part of the drawing numbers quoted in the EOI (NAL/PUR/ACD/200/20-Z). |
| 19 | CSIR-NAL provide the number of fuselage frame and stringer stations. | The number of fuselage frame and stringer stations shall be provided in RFQ document. The tentative number of frame stations can be assumed to be 38 and about 50 (max) stringers. |
| 20 | CSIR-NAL provide the number of stations in Wing, HT and VT | The number of stations in wing, HT and VT shall be provided in RFQ document. The tentative number of Wing stations can be assumed to be 29 and about 14 (max) stringers, on each side. The tentative number of HT stations can be assumed to be 8 and about 6 (max) stringers, on each side. The tentative number of VT stations can be assumed to be 7 and about 7 (max) stringers. |




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| 21 | CSIR-NAL to confirm on major change impacting the front fuselage structure when compared to the SARAS-PT1N. XXXX understands that the changes in SARAS MK2 is High wing configuration and Pusher to Tractor configuration. CSIR-NAL to confirm whether all parts of front fuselage will undergo detail design in DDP. | All parts of fuselage structure will undergo detail design in DDP. |
| 22 | CSIR-NAL to confirm if all the standard parts (fasteners) 3D models need to be placed in assembly? | All standard parts 3D models need to be placed in assembly. |
| 23 | Is there any requirement to create CPM (Composite manufacturing) models & CER (Composite Engineering Requirement)? | lease see page 18 of EOI (NAL/PUR/ACD/200/20-Z). CD3/CPD models (ply by ply model) have to be created for outer skins of composite parts to create ply book as well as flat pattern for layer cutting. CPM is a submodule of CD3. |
| 24 | During manufacturing will 3D model be considered as master or 2D drawings? | 2D drawings would be considered as master. However, 3D data shall be used as applicable (example: NC programming of machined parts). |
| 25 | For all the control surface mechanisms, CSIR-NAL will provide the master geometry and mechanism. XXXX will be responsible for detail design of the parts and simulating kinematics to check for clash and clearance. CSIR-NAL to confirm. | Yes. |
| 26 | Please clarify how the response to the Eoi needs to be sent. Is a hard copy expected to be sent? Please suggest where the documents need to be updated. | BID to be submitted in hard copy to the following address: - Controller of Stores & Purchase CSIR-National Aerospace Laboratories HAL Airport Road, Kodihalli Bengaluru – 560 017 Tel #: 25086040 / 6041 / 6044 (Refer Sr. No.5 of NIT [EOI Document]) |



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| 27 | Annexure-1, Essential requirements section, Point# 17 : kindly confirm that 'CEMILAC / DGCA / EASA / FAA or equivalent country specific regulatory authority approved airframe design' is a must or CEMILAC / DGCA / EASA / FAA or equivalent country specific regulatory authority approved for Design would be sufficient. | CEMILAC / DGCA / EASA / FAA or equivalent country specific regulatory authority approved airframe design is required. |
| | Request NAL to provide below information for accurate estimates for items 28-34 | |
| 28 | Load cases, Seed model, NMG, material data, checklists and templates will be supplied by NAL | The input data listed under section 5 of EOI (NAL/PUR/ACD/200/20-Z) will be provided by CSIR-NAL to the successful bidder after RFQ process. |
| 29 | Material data of NAL provided 3D models is pre assigned or service provider has to decide and assign material properties? | CSIR-NAL will supply preliminary CATIA V5 3D models from PDP as in section 5 of EOI. These models will have major components only and material for these major parts are identified by CSIR-NAL. However, the engineering service provider needs to carry out detail design as defined in EOI and create a detailed 3D CAD models of the structure. The engineering service provider needs to assign the material properties (like density) to CAD model at detail design phase. |
| 30 | Is any Kinematic analysis needs to be performed for the mechanism? | Yes, Kinematic analysis needs to be performed for the mechanism by the engineering service providers. The following checks are to be carried out namely check the correct working of the movements, check for clash / clearance with adjoining structure, when all detail designed parts are positioned. |
| 31 | Loft/Skin assembly fasteners locations are defined are need to define by Service provider? | Loft/Skin assembly fasteners at all locations are to be defined by the engineering service provider. |
| 32 | NAL able to provide structural provisions for mechanical and other systems at T0? | CSIR-NAL will provide the location of mechanical and other systems. The engineering service provider needs to design/provide structural provisioning (bracketry) for those systems. |

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| 33 | As detailed design phase is evolutionary and iterative, any major design change leads to Iterative analysis. This clause has to be captured as "if necessary". | The engineering service provider, while carrying out detail design, may have to carry out iterations as necessary to arrive at an optimum design before submitting it for a review to CSIR-NAL. |
| 34 | Is lightning protection schemes are scope of supply? | Lightning protection schemes are scope of supply. CSIR-NAL shall provide legacy data as reference, during execution to the successful bidder. |
| | Following is the brief understanding of scope, Would like to request NAL to review and confirm for SI.No.35 and 36 | |
| 35 | <p>Execution of work includes:</p> <p>I. Extracting the structural load cases from Project definition phase (PDP) document for each sub-system till component level.</p> <p>II. Detail sizing of Parts and assemblies.</p> <p>III. Establish methods for stress analysis and Fatigue and Damage Tolerance (FDT)</p> <p>IV. Stress Analysis (Metals and Composites)</p> <p>V. Optimization of # of layers and layer orientation in anisotropic composite materials</p> <p>VI. Create manufactural 3D parts and detail drawings (Metals and Composites)</p> <p>VII. Clash analysis at assembly level</p> <p>VIII. Drafting as per NAL standards</p> <p>IX. GD&T and Stack up</p> <p>X. Support to Manufacturing, installation and integration</p> <p>XI. Support during flight testing to clear snags and any NCs</p> | Yes, the execution of work includes those that are mentioned, but partially. However, the complete expected requirements are indicated in section 6 of EOI (NAL/PUR/ACD/200/20-Z). |
| 36 | <p>Outputs to be submitted to NAL:</p> <p>I. Established methods of Analysis</p> <p>II. Detail size ,weight and C.G data</p> <p>III. Analysis reports</p> <p>IV. ICD (Interface clearance drawing)</p> <p>V. 3D models and detail drawings</p> <p>VI. Tooling requirements and tooling drawings</p> <p>VII. Composite parts –detail design</p> <p>VIII. Macros and Automation tools used.</p> | Yes, the deliverables of work includes those that are mentioned, but partially. However, the complete list of deliverables is indicated in section 8 of EOI (NAL/PUR/ACD/200/20-Z). |



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| 37 | Would it be possible to get installation and assembly BOM (Bill of Material) for Fuselage and Wing for this or previous version airplane configuration? We understand every airplane configuration is unique in some critical aspects and this information would help us have improved ROM estimates. | Installation and assembly BOM will have to be worked out by the engineering service provider during detail design phase for SARAS MK-2. Standard of preparation (SOP) or Drawing Applicability List (DAL) from earlier variant will be shared with successful bidder after RFQ process. |
| 38 | Digging in the website I couldn't find the mentioned forms, Can you please share the forms with us? | Vendor details are to be filled in as per Annexure-I in page 27 of EOI (NAL/PUR/ACD/200/20-Z) Vendor Appraisal Form is to be filled as given in Annexure-II in page 29 of EOI (NAL/PUR/ACD/200/20-Z). |
| 39 | Is the Budgetary Estimate is mandatory at this stage? | Please refer clause 17.5 in page 24 of EOI (NAL/PUR/ACD/200/20-Z) document. Please refer clause in 'Essential Requirements' B 18 in Annexure-I page 28 of EOI (NAL/PUR/ACD/200/20-Z) document. |
| 40 | In the OEI it is mentioned that the EOI should be submitted to Controller of Stores & Purchase. Can we submit the OEI through- Email: purchasek@nal.res.in, mkala@nal.res.in, spo@nal.res.in? | BID to be submitted in hard copy to the following address: - Controller of Stores & Purchase CSIR-National Aerospace Laboratories HAL Airport Road, Kodihalli Bengaluru – 560 017 Tel #: 25086040 / 6041 / 6044 (Refer Sr. No.5 of NIT [EOI Document]) |
| 41 | What is the time frame for the "Design and Manufacturing of SARAS MK-2 Passenger Door"? | The EOI for "Design and Manufacturing of SARAS MK2 Passenger Door" has not been released yet. Request to check in CSIR-NAL website periodically. |
| 42 | How do you see the path forward with production? | This EOI (NAL/PUR/ACD/200/20-Z) is only for Detail design and engineering of airframe. |
| 43 | Can we express our interest in all four Work Packages? | Please refer clause in 'Essential Requirements' B 18 in Annexure-I page 28 of EOI (NAL/PUR/ACD/200/20-Z) document. The Bidder may submit an expression of interest for any or all the items under the Scope of Work as per EOI (NAL/PUR/ACD/200/20-Z). |
| 44 | Can we explain what will be the path forward and timeline? | "Overall process followed for procurement of Engineering Services is given in clause 10 in page 22 of EOI (NAL/PUR/ACD/200/20-Z) document. |

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| 45 | What will be the maturity level of 3D models post PDR Exit? | As stated in the section 5 of the EOI (NAL/PUR/ACD/200/20-Z), under Preliminary CATIA V5 3D models (layouts) from PDP. All 3D models may not be available. However, Preliminary CATIA models for critical load bearing members will be provided. |
| 46 | Before the start of the Detail design phase, It is assumed that product structure in PLM is finalised? If not finalised, what will be the maturity level of product structure? | Top level (2 to 3) product structure will be provided in the PLM. Successful bidder will be given access to create sub-assembly and part level product structure. The Product tree structure for systems will be positioned during detail design phase, as read only. |
| 47 | Which PLM software will be used by NAL for SARAS Mk-II? Is it Teamcentre or 3D Experience? | Teamcenter PLM is likely to be used. The details will be given in RFQ. |
| 48 | Will the PLM access be provided outside India, In case Engineering Service Provider wanted to leverage global expertise? | Modalities of giving access to outside parties will be looked into based on specific requests. Also refer clarification to SI.No.01. |
| 49 | What are the tools expected for Fatigue and DTA? We assume MSC Fatigue for Fatigue Analysis and NASGRO for DTA? Please confirm? | MSC NASTRAN (Embedded Fatigue) is for fatigue analysis. FRANC 3D / MSC MARC is preferable for DTA. |
| 50 | 2600 drawing LHS side, so identical number for RHS side (except local asymmetry 'unhanded')? | 2600 drawings are indicated only of work package 1. No separate drawings are needed for RH parts. However, RH 3D parts and assemblies shall be placed in location by the engineering service providers. |
| 51 | Rearward pressure bulkhead' is not presented, is it included in 'Tail cone'? | Rear Pressure bulkhead is indicated in center fuselage. |
| 52 | Quality of deliverables, calculation ratio to be defined? | The details will be provided in RFQ. |
| 53 | Are the long-cycle parts identified? | Long-cycle parts will be identified and provided to the successful bidder after RFQ process. |
| 54 | Are border and junction drawings provided or to be done? | The details will be provided in the RFQ. |




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| 55 | To be confirmed that following topics are out of scope: - GFEM build-up and/or update - Thermal calculation - Aerodynamic calculation - Bird strike calculation - Crashworthiness analysis | As per EOI (NAL/PUR/ACD/200/20-Z), these topics are out of scope. |
| 56 | A short description of SARAS MK2 main characteristics (MTOW, Range, Max Heights, pressure level, ...?) | Performance details will be shared with successful bidder after RFQ process |
| 57 | A brief architecture description (number of panels, frame, stringer, number of PAX doors, ...) | Please refer clarifications to SI.No.19 and 20. |
| 58 | When will the aircraft be certified (at what stage of the planning; p15)? | Certification of SARAS Mk-2 is planned in May 2024 |
| 59 | We request for additional documents for certification? (compared to the documents requested in the specifications) | Certification basis will be as per FAR 23 amendment 64. |

Agree

