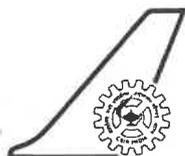


Date of Publication: 20 November 2019



Council of Scientific and Industrial Research  
**NATIONAL AEROSPACE LABORATORIES**  
P.B. No.1779, HAL Airport Road, Kodihalli, Bengaluru – 560 017

**Advt. No. 7/2019**

**APPLY OFFLINE BEFORE 5<sup>TH</sup> DECEMBER 2019**

(Website: [www.nal.res.in](http://www.nal.res.in))

National Aerospace Laboratories (NAL) is a premier research laboratory under the Council of Scientific and Industrial Research (CSIR). In addition to many Research, Development and Technology Programmes in Aerospace, CSIR-NAL is actively involved in supporting the National Aerospace Programmes of ADA, DRDO, ISRO, HAL and IAF. Further, CSIR-NAL has a strong programme in Civil Aviation including the nationally important project of design and development of a multirole Light Transport Aircraft (SARAS). CSIR-NAL is also exploiting several aerospace technologies into spin-off industrial applications. It has excellent facilities in all the aerospace disciplines.

NAL is looking for bright and highly motivated Consultants to participate in the exciting task of Aerospace R&D, Technology Development and related applications:

Please go through the full text of the advertisement on our website: [www.nal.res.in](http://www.nal.res.in) regarding qualifications, job requirements, experience and subjects etc. required for each position.

Download the Application form from the CSIR-NAL website and take print out of application fill all the Column's together with copies of certificates and testimonials etc. only will be entertained.

Your selection will be based on the details entered in the Offline Application Form only.

## **I AERODYNAMICS DESIGN CONSULTANT:**

**Qualification:** BE/B.Tech with 25 years OR ME/M.Tech in Aerospace Engineering or Equivalent with minimum 20 years of experience.

**Experience:** At least 20 years of experience in Aerodynamic design and analysis of aircraft, Flight Mechanics, application of CFD tools and Wind Tunnel Testing methods, Flight Test data analysis and documentation for airworthiness compliance.

**Number of consultant:** 1 (One)

### **Job Requirements:**

- Work closely with the Aerodynamics team in the review and optimization of the configuration design considering prescribed/practical geometry constraints. Estimation of performance and configuration sizing, Weights budgeting, Trade-off and Sizing studies, Sensitivity studies.

 1

- b) Optimize the engine/airframe integration and modelling approach. Estimation of power effects and one engine inoperative conditions. Provide guidance to project team for the development of the flight performance simulation environment.
- c) Estimation of stability and control derivatives, hinge moment parameters using engineering and CFD methods in coordination with CSIR-NAL. Reconcile differences in aerodynamic performance, stability and control between flight tests and CFD / Analytical estimates.
- d) Wind tunnel programme preparation and analysis of wind tunnel data, Definition of Aero data set, Drag estimation, Thrust and Drag Book keeping.

**Deliverable:**

- Reports on a) to d) activities listed above

**II STRUCTURAL DESIGN CONSULTANT:**

**Qualification:** Minimum BE/B. Tech in Aerospace, Mechanical or Equivalent with minimum 25 years of experience OR ME/ M.Tech in Aerospace, Mechanical or equivalent with 20 years of experience

**Experience:** Design of airframe using metallic and composite materials.

**Number of consultants: 2 (TWO)**

**Job Requirements:** Design of Airframe conforming to FAR 23 compliance requirements as given below:

**I. Structural Layout and Preliminary Design**

- a) Define structural layouts and station diagrams for full airframe namely wing, HT, VT, control surfaces and fuselage and fixing of ICY points
- b) Design concepts of following major joints
  - 1) Wing-Fuselage
  - 2) VT-Fuselage
  - 3) HT-VT
  - 4) All Control surface joints including Flaps, trim tabs attaching with their respective parent surfaces
  - 5) MLG/NLG-Fuselage
  - 6) Engine-Pylon, Pylon-Wing or Pylon-Stub wing with fuselage depending on configuration
  - 7) Wing-Winglet
- c) Finalisation of schemes for major skin splicing in fuselage, wing, HT and VT taking into account various design considerations such as damage tolerance, sealing, ease of manufacturing, assembly and maintainability
- d) Finalisation of metallic materials and design allowables considering fatigue requirements
- e) Schemes for ensuring crashworthiness of fuselage
- f) Finalisation of cockpit and passenger cabin layout



- g) Finalisation of passenger door and emergency door locations
- h) Finalisation of luggage volume, baggage-stacking arrangement, baggage loading and unloading procedures.
- i) System to fuselage interface design conforming to LRU/equipment and system layout. Feasibility of standardizing the interface brackets and corresponding support structure on the fuselage
- j) Review equipment layout and maintainability
- k) Recommendations on direct and indirect effects of lightning on composite structures (e.g. composite wing with fuel tank)

## **II. Mechanisms**

- a) Review of ICY points associated with mechanisms
- b) Finalisation of schemes for control surface deployment mechanisms
- c) Finalisation of schemes for door mechanisms (Latching and Locking), fixing of door kinematic points/ICY points with respect to fuselage
- d) CAD models of major elements of mechanisms with kinematics simulation
- e) Estimation of actuating forces for moving surfaces
- f) Define clearance between parent and moving surfaces for proper deployment considering structural deformations during flight
- g) Review of landing gear door mechanism
- h) Review of FCS linkages and pilot control mechanisms

### **Deliverable:**

Submit report on activities listed in I (Structural Layout and Preliminary Design) and II (Mechanisms) above.

## **III MECHANICAL SYSTEMS – LANDING GEAR, HYDRAULIC SYSTEM, MANUAL FLIGHT CONTROL SYSTEM, FUEL SYSTEM AND ENVIRONMENTAL SYSTEMS: CONSULTANTS**

**Qualification:** Minimum BE/B.Tech in Aerospace, Mechanical or Equivalent with minimum 25 years OR ME/M.Tech with minimum of 20 years of experience in Aircraft Landing gear and Hydraulic System Design.

**Experience:** Design of aircraft Landing Gear, Wheels and Brakes. Design of Aircraft Hydraulic System.

**Number of consultant:** 1 (One)

### **Job Requirements:**

- A) Define Landing gear configuration including wheels; design of landing gear installation interface with airframe and generation of drawings, sizing of LRU's and generation of test matrix etc.;
- B) Design of architecture for hydraulic system, sizing and generation of specification and sourcing of LRU's. Design of Brake and antiskid system etc. Detail design of system and generation of installation drawings of LRU's. Generation of test matrix etc.

### **Deliverable:**

Submit Report and drawings on Job requirements given in A) and B) above as applicable

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## **IV PROPULSION AND FUEL SYSTEM- CONSULTANT**

**Qualification:** Minimum BE/ B.Tech in Aerospace or Mechanical engineering with at least 25 years of experience OR ME/M.Tech with minimum 20 years of experience.

**Experience:** Selection and design for integration of Turboprop power plant onto an aircraft. Turboprop power plant subsystems design and development. Knowledge on FAR regulations and certifications related to CEMILAC, RCMA & DGAQA.

**Number of consultants:** 1 (One)

**Job Requirements:** Propulsion System, its matching with configuration and Integration on aircraft with:

- a) Review of Engine and fuel system: LRU selection and location on aircraft
- b) Design inputs for Engine Control system to achieve desired power response to throttle input
- c) Review of engine oil cooling system design, air intake design and engine exhaust design for efficient operation.
- d) Review of system level testing to fulfill airworthiness requirements.
- e) Review of propulsion system for overall efficiency.

**Deliverable:**

Consultancy for Turboprop engine procurement, subsystems design and integration on to SARAS-Mk-2 aircraft.

Report preparation for the above a) to e) activities

## **VI QUALITY AND CERTIFICATION- CONSULTANT**

**Qualification:** Minimum BE/B. Tech in Aerospace, Mechanical or Equivalent with at least 25 years of experience OR ME/M.Tech with minimum of 20 years of experience

**Experience:** Certification of Turboprop category aircraft

**Number of consultants:** 1 (One)



**Job Requirements:** Certification as per FAR23 standard with selected FAR25 clauses and

- a) Review Means of Compliance Basis Table; Aircraft and System/Sub-system evaluation tests;
- b) Review of system safety assessment
- c) Prepare Document detailing comprehensive Flight Test Plan for assessment of flight characteristics leading to certification
- d) Provide support in Flight Test activity and documentation to meet airworthiness standards

**Deliverable:**

Submit report on a) to d) activities above

## **VII AVIONICS AND FLIGHT CONTROLS CONSULTANT**

**Qualification:** Minimum BE/B. Tech in Aerospace, Electrical / Electronics or Equivalent with at least 25 years of experience in

**Experience:** To provide consultancy for typical FAR 23 category civil aircraft avionics, electrical and flight controls

**Number of consultants:** 1 (One)

**Job Requirements:**

- a) System Architecture definition and finalization for Avionics
- b) System Architecture definition and finalization for Electrical
- c) System Architecture definition and finalization for Automatic Flight Control
- d) Sizing of power sources, master control system, battery, distribution systems
- e) Identification of state of the art technologies, LRU components with part numbers
- f) Preparation of BOM
- g) Preparation of route to certification including flight testing
- h) EMI/EMC and Lightning Zonal analysis
- i) Antenna citing analysis
- j) Sizing of actuators for flight controls systems

**Deliverable:**

Submit report on a) to j) activities above as applicable



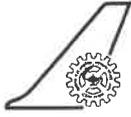
## **GENERAL CONDITIONS:**

1. These positions are open only to Indian Nationals/Overseas citizens of India.
2. The appointment will be in the CSIR - National Aerospace Laboratories (NAL), Bengaluru, under the Council of Scientific & Industrial Research (CSIR) which is an Autonomous Body under Ministry of Science & Technology, Govt. of India.
3. The engagement is for temporary duration of one year and extendable up to one more year based on review and project requirement.
4. Age should not be more than 65 years.
5. Relaxation : The qualifications, age and experience can be relaxed in the case of exceptionally meritorious candidates with the approval of DG, CSIR.
6. The minimum remuneration is fixed @ Rs.70,000/- p.m. However, the higher rate of remuneration (consolidated) will be fixed by the Competent Authority based on the recommendation of the Expert Committee and based on expertise and experience of the candidates, keeping in view the extant guidelines of CSIR.
7. Candidate: Should be creative, innovative and a well-recognized scientist/technologist having a demonstrated leadership and man-management qualities and to manage multidisciplinary R&D teams with excellent interpersonal relations.
8. The period of experience in a discipline/area of work, where prescribed, shall be counted with effect from the date of acquiring the prescribed minimum educational qualifications for the post.
9. As the Screening/Shortlisting of applications will be done on the basis of information furnished through the Offline application form by the applicants, it is necessary that only accurate, full and correct information is furnished by the applicants. Furnishing of wrong/false information will be a disqualification and CSIR-NAL will **NOT** be responsible for any of the consequences of furnishing such wrong/false information.
10. The decision of Director, CSIR-NAL in all matters relating to eligibility, acceptance or rejection of applications, mode of selection will be final and binding on the candidates and no enquiry or correspondence will be entertained in this connection from any individual or agency on behalf of the candidate.
11. Canvassing in any form and/or bringing in any influence political or otherwise will be treated as a disqualification for the post.
12. In the event of engagement of the Consultant, the Consultant has to execute an agreement in the format on Non-judicial stamp paper.
13. Eligible candidates may download the application form from CSIR-NAL website: [www.nal.res.in](http://www.nal.res.in). **(given at the end of full advertisement)**. Application form duly filled in together with recent passport size photograph, copies of matriculation / Degree and above, Experience and certificate with reference to nature of work carried out etc., should be sent in a sealed cover superscribing "**Application for the post of " \_\_\_\_\_ " Consultant**" Advt. No. 7/2019 ON OR BEFORE 05.12.2019 addressed to:

**The Controller of Administration  
National Aerospace Laboratories  
P.B.No.1779, HAL Airport Road  
Kodihalli, Bengaluru – 560 017 (Karnataka).**

**INTERIM ENQUIRIES WILL NOT BE ENTERTAINED**





(Council of Scientific and Industrial Research)  
**NATIONAL AEROSPACE LABORATORIES**  
BENGALURU – 560 017

Affix a signed  
copy of your  
recent  
passport size  
photograph

### APPLICATION FORM

**IMPORTANT:** This application form duly completed in the candidate's own handwriting or neatly typed must reach THE CONTROLLER OF ADMINISTRATION, NATIONAL AEROSPACE LABORATORIES, P.B.No.1779, AIRPORT ROAD, KODIHALLI, BENGALURU-560 017 on or before **5<sup>th</sup> December 2019**

1. Advertisement No. : **7/2019**
2. Post : **CONSULTANT**
- 3: Division :

4. Name of the candidate (in Block Letters)	
5. Sex (Male / Female)	
6. Father's Name	
7. Nationality (mention by birth / domicile)	
8. Present Postal Address (for communication purpose)	Pin Code <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> Tel/Mobile No. _____, E-mail: _____
9. Permanent Address	Pin Code <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> Tel/Mobile No. _____

<b>10. Date of Birth</b> (As per Matriculation / SSLC certificate)	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
	DAY	MONTH	YEAR
<b>11. Age</b> (As on the closing date of application)	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
	YEARS	MONTH	DAYS

**12. Educational/Professional Qualification etc, commencing from SSC/10<sup>th</sup> Std onwards**  
(Enclose documentary proof)

Examination Passed	Year of passing	Marks obtained / percentage of marks			Class / Grade obtained	Duration of Degree/ Diploma Course	Board / University / Institution
		Max Marks	Marks obtained	Aggregate %age			

**13. Experience:**

Period		Name of Organisation* & Place	Designation/ Post Held	Gross Pay Drawn Rs.	Permanent/ Temp. Post
From	To				

**Note :** \* Please indicate whether the Organisation belongs to Govt./ PSU or Pvt. Also enclose copies of certificates/testimonials etc in support of proof of experience.

**14. Any other details :**

15. Particulars of close relatives : Name :  
working in NAL, if any  
Designation :  
Division :  
Relationship :

16. Are you under any bond/contractual obligation to serve Central / State Government / PSU / Autonomous or any other body / organization, YES  NO

17. Whether dismissed from service from any other Institution / Office or debarred by the Public Service Commission, YES  NO  , if yes, give details \_\_\_\_\_

18. ENCLOSURES: (Please tick the appropriate box and arrange the enclosures as per the serial number)

- |   |                          |  |                          |
|---|--------------------------|--|--------------------------|
| 1. SSLC/10 <sup>th</sup> Std. Certificate<br>(Proof of DOB) | <input type="checkbox"/> | 5. Community Certificate                 | <input type="checkbox"/> |
| 2. 12 <sup>th</sup> Std. Certificate                        | <input type="checkbox"/> | 6. Experience Certificate                | <input type="checkbox"/> |
| 3. Degree/Diploma   | <input type="checkbox"/> | 7. Knowledge of Computer<br>Applications | <input type="checkbox"/> |
| 4. Degree/Diploma Marks sheets<br>(All semesters/Years)     | <input type="checkbox"/> | 8. Others                                | <input type="checkbox"/> |

### **DECLARATION**

**I hereby declare that the information given above is correct, true to facts and nothing has been concealed / distorted. I am aware that, if at any time I am found to have concealed / distorted any information, my candidature/appointment is liable to be summarily terminated without notice.**

Place: \_\_\_\_\_

Date: \_\_\_\_\_

\_\_\_\_\_  
Signature of the candidate

