Activity: Work Package for ASE analysis, SCT and Computation of maximum ASE response envelopes for LCA AF Mk1A

Work package Name & Description:

SN	Description of the package	Quantity	Unit
1	Work package required for ASE analysis, SCT and computation of maximum ASE envelopes for several aircraft configurations for LCA AF Mk1A (4 members)	80	Man Months

1. Introduction

   a. Airframe directorate is responsible for carrying out analysis and testing activities for assessment of servoelastic and aeroservoelastic interactions for LCA AF Mk1A

   b. The work package is intended to meet work package requirements to ensure timely completion of work

   c. Duration of analysis/ test activities is planned for a period of 20 months.

2. Scope of Work

Work package involves Structural Coupling Test (SCT) & Aeroservoelastic (ASE) analysis for LCA AFMk-1A spanned over 20 months duration. The work package would be required to carry out / assist in following activities:

   • **Pre-processing for aircraft meshing:** Import geometry /mesh and clean up in HYPERMESH.

   • **Meshing:** Generation of 1D mesh for different stores and integration with aircraft using PATRAN/ HYPERMESH. Creation of 2D panel aero meshes and splining with structural mesh using PATRAN.

   • **Servoelastic and Aeroservoelastic response computations:** Carrying out modal analysis using NASTRAN. Computation of servoelastic and aeroservoelastic responses for aircraft using MATLAB software. Critical load cases identification for SCT.

   • **Testing:** Monitoring SCT conducted for critical load cases at HAL and test data processing using MATLAB.

   • **Post processing:** Test and analysis results correlation, computing maximum response envelopes, analytical model updation and report preparation.

3. Project Schedule and Milestones

Work will be carried out as per program schedules and availability of new store models for integration on LCA MK-1A, namely single ASRAAM, twin ASRAAM and other new stores.

Complete project shall be executed in twenty months. Table-1 shows schedule of activities and each cell in the Table corresponds to one month.

<p align="center">Table 1 : Project Schedule & Milestones</p>

Months \ Milestones	1-4				5-8				9-12				13-16				17-20			
Milestone 1 : Single ASRAAM	■	■	■	■																
Milestone 2 : Twin ASRAAM					■	■	■	■												
Milestone 3 : Stores & SCT									■	■	■	■								
Milestone 4: Model Updation													■	■	■	■				
Milestone 5 : Report Preparation																	■	■	■	■

4. Performance and Payment

a. The contract shall be a fixed price contract.

b. Depending on performance and successful completion of Milestones, payment would be made as per the weightage assigned to each milestone as listed in Table-2.

<p align="center">Table 2: Project Schedule & Milestones</p>

S.N.	Milestone	Weightage in %age with respect to the total order value	Deliverables
1	Milestone 1	20	F.E. mesh generation of single ASRAAM and integration with LCA AF Mk1A model, ASE analysis for given configurations and analytical computation of servoelastic responses, report generation
2	Milestone 2	20	F.E. mesh generation of twin ASRAAM and integration with LCA AF Mk1A model, ASE analysis for given configurations and analytical computation of servoelastic responses, report generation

			F.E. mesh generation of additional new store and integration with LCA AF Mk1A model, ASE analysis for given configurations and analytical computation of servoelastic responses, report generation. SCT for LCA AF MK-1A configurations
3	Milestone 3	20	
4	Milestone 4	20	Test-analysis correlation and analytical model updation
5	Milestone 5	20	Test data analysis in detail, Servoelastic response data generation and report generation

5. Proposed team structure

5.1 Required Qualifications & Skill Set

Team structure 04 (Four) resources with experience requirements is given in Table 3 below:
The engineer must be having basic understanding of finite element analysis procedures. The engineer should be well versed with software tools such as NASTRAN, PATRAN, HYPERMESH, CATIA V5/V4 or above and MATLAB programming. Proficiency in MS Word, MS Excel and MS Power Point software is added advantage.

Table-3: Required Qualifications & Skill set for work package for executing the tasks

Group / Area	Essential Qualifications	Experience	Skill set	Estimated Team size
Aeroservo-elasticity	Essential: BE/B.Tech (Mechanical/ Aerospace) Desirable: M.Tech (Mechanical/ Aerospace)	a) BE/B.Tech with 0- 2 years Or M.Tech b) Candidate with software skills will be preferred	Dynamic / Aeroelastic analysis of aircraft structures, NASTRAN, PATRAN, Hypermesh, MATLAB programming	04

5.2 Evaluation by ADA

Supplier shall evaluate the engineer and submit the bio-data of the engineer designated for this project, which would be scrutinized before acceptance and would be kept confidential. The biodata of the engineer shall be submitted along with the proposal.

The team member's profile designated for this project by the Supplier shall be reviewed and scrutinized by ADA before accepting.

5.3 Resource Requirement

AF Directorate shall provide office space for the four engineers, hardware and software required to execute the work.

Relevant training of software usage will be provided on need basis to the selected engineers to execute the defined work.

5.4 Replacement:

It is required to have the same engineer throughout the duration of this project. However, in case of change/replacement, advance information (before 3 months) shall be given to ADA. ADA shall evaluate engineer for technical suitability /adequacy for this project. The qualification, expertise & screening requirements remain the same for the proposed candidates for replacement.

If any engineer is resigning, then replacement engineer and resigned engineer will have one-month common period for knowledge transfer. And ADA will not bear cost of engineer on common period.

6. Pre-requisites to be met by the Supplier (Vender qualification criteria)

   i.   The supplier shall be ISO 9001 certified or equivalent and produce relevant documents.

   ii.   The supplier's project team shall have past experience in the 2D and 3D mesh generation using HYPERMESH, MSC Nastran deck creation using MSC PATRAN, Pre-processing and post processing using MSC PATRAN

   iii.   Supplier's project team shall have experience in MATLAB

   iv.   The supplier's project team would be evaluated by ADA (Acquirer) before assigning the project activities.

   v.   Supplier shall sign NON-DISCLOSURE Agreement with ADA.

   vi.   Environment required for executing the project shall be set up at the ADA place.

vii. The entire activity of this work shall be carried out at premises of ADA, Bengaluru. The Project Team shall be positioned at ADA during the contract period with minimum duration of 8.5 hours/day. The working days will be 5days per week.

viii. ADA would interact with project team for technical discussions, meetings, etc. The holidays shall be as per ADA holidays list.

ix. All items developed by supplier under this project are proprietary of ADA and shall not be disclosed and supplier does not have any rights on the work carried out during the project period. The work carried out shall be submitted to the ADA with reports.

x. Periodical project review shall be conducted with the supplier at least once in a month. The constitution of the review team shall be worked out at ADA. Management review shall be conducted once in 3 months.

xi. Supplier shall maintain highest level security for the items developed and for the development environment for this project.

xii. Normal working hours are 8.30AM to 5:00PM. However, depends on the project requirement work hours shall be changed. The project team shall be prepared to work on weekends and holidays in order to meet the schedules, if required.

xiii. Slipping of the milestone would be dealt seriously and may lead to termination of the contract with a one-month notice.

xiv. Supplier shall not subcontract the project. Employee deputed to this work shall be regular employee of the company and no contract work package of the company shall be deployed for this work.

xv. The supplier's company should be registered with Indian companies Act.

xvi. The supplier should have at least 3-5 years of experience in performing this kind of work

xvii. The supplier should supply work package within two weeks from PO release date

xviii. Supplier shall submit the resume of the prospective candidates for technical suitability / scrutiny / interview / screen by ADA before deployment and would be kept confidential. The successful Bidder shall submit the bio-data of the engineer on acceptance of the contract.

xix. Supplier would carry out police verification of the deputed engineer.

xx. ADA may also assign the task on need basis.