Annexure 1: Scope of Work

Activity: AMCA loads generation of Aircraft & stores

Duration: 24 Months

Resource: Minimum 2 resources(engineers)

1. Introduction

A full aircraft load generation has to be carried out for different configurations of the flight loads, store loads and station loads.

2. Pre-requisites to be met by the Supplier

I. The supplier shall be ISO 9001 certified or equivalent.

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. 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 six days per week.

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

VIII. Supplier does not have any rights on the work carried out during the project period. The work carried out shall be submitted to the project coordinator, ADA, with reports and maintain confidentiality.

IX. 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.

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

XI. 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.

XII. Slipping of the milestone would be dealt seriously and may lead to termination of the contract with a one-month notice. Vendor need to deploy additional resources, if required without additional cost

XIII. Supplier shall not subcontract the project. Employee deputed to this work shall be regular employee of the company and no contract man power of the company shall be deployed for this work. EPF and ESI contribution details to be provided with invoice.

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

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

XVI. The supplier should supply resources within one month from PO release date, and any failure to deploy resources shall attract LD.

XVII. The supplier should participate Compulsorily in the pre-bidding meeting.

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 tasks on need basis.

XXI.   Deputed engineers will not be allowed to carry electronic gadgets like Mobile phones, laptop, pen drive etc.

XXII.   Prominent Working place is at ADA campus 1, on need basis may have to work in ADA campus 2.

3. Scope of Work

The process to be followed is briefly described below. A full aircraft manoeuvre load generation has to be carried out for different configurations of the flight loads, store loads and station loads. The work involves 3D and 2D mesh generation for full aircraft/different components of aircraft for different configurations. Creation of groups of Nodes and Elements, Splining of aeromesh and GFEM mesh, Pre-processing and Post processing using MSC Patran. Report generation using Microsoft word. ADA may also define the other task on need basis.

3.1 Mesh generation

1. Generating the 3D and 2D mesh of the aircraft.
2. After the grid generation, Supplier has to check the grid for its quality. Supplier shall get the grid verified by the Acquirer. After the verification of the results, the Supplier shall go ahead with report generation.

3.2 Pre-Processing and Post Processing

1. Creation of groups of nodes and elements in MSC Patran
2. Assigning material properties and Sectional Properties
3. Post processing using MSC Patran and in house MATLAB codes
4. Preparing presentation and generating report in Microsoft word

4. Responsibility

4.1 ADA's Responsibility

i) ADA will define the task as per milestones.
ii) The generation of inputs and requirements.
iii) Provide required Software tools and Hardware resources.
iv) Orientation/familiarization of the work
v) Periodical review (technical & contractual) and records of discussion.
vi) Monthly review shall be conducted by ADA. Supplier team shall participate.
vii) Acceptance of the deliverables as per the milestones and clearance for relevant payments.

4.2 Supplier's Responsibility

i) Project team should carry out the task assigned by ADA as per milestone.
ii) The supplier shall generate the mesh for the aircraft/components of aircraft, interact with ADA personnel for inputs and requirements.
iii) Check the grid for skew elements, aspect ratio etc.
iv) Generation of MSC Nastran Deck
v) Post processing using MSC Patran and in house MATLAB scripts
vi) The work carried out as a part of the project to be submitted as a report.
vii) Periodical reviews will be conducted by ADA. Supplier shall create/make technical presentation on the progress on fortnightly basis.

4.3 Project Schedule and Milestone

i) Complete project shall be executed as 8 different configurations. Each cell in the Table-1 corresponds to one month.
ii) Milestone 1: Generation of Mesh and input Deck Preparation
iii) Milestone 2: Post processing and report generation
iv) This indent is for 24 Calendar months
v) The TO for start of the work will be deputation date of man power *or 30 days from the date of contract which ever is earlier.*

Table 1

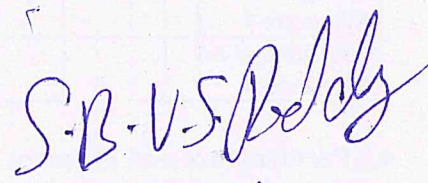| Months / Milestone (Up to Month)	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24
Configuraion-1 Milestone-1	███							
Configuraion-2 Milestone-2		███						
Configuraion-3 Milestone-3			███					
Configuraion-4 Milestone-4				███				
Configuraion-5 Milestone-5					███			
Configuraion-6 Milestone-6						███		
Configuraion-7 Milestone-7							███	
Configuraion-8 Milestone-8								███

4.4 Performance and Payment

1. This contract shall be a fixed price contract.
2. Depending on performance and successful completion of Milestones, the payment would be made as per the Weightage assigned for each milestone on quarterly bases at rate of 12.5% per quarter

Table 2

Sl. No	Milestone & completion date	Weightage in % with respect to the total order value	Deliverables
1	Milestone 1 T0+3months	12.5	**Iteration 1:** a) Familiarization of work. Assist in the load computation Activities like i) Splining of 2D Aeromesh and GFEM ii)Splining of 3D aeromesh and GFEM iii) Creation of Node set and element Set of GFEM and Aeromesh a) Geometry clean-up for **config. 1** b) Pre-processing of Deck c) Run the computation d) Post processing results using MSC PATRAN and MATLAB scripts d) Report generation e) Repeat above tasks if there is any change in any of the mesh
2	Milestone 2 T0+6months	12.5	**Iteration 2:** a) Geometry clean up for **config. 2** b) Assist in Aero mesh generation c) Force and moment comparison on CFD mesh and Aeromesh generated by loads team d) Generate deck for load computation e) Assist in the load computation f) report generation and other Activities similar to config.1

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3	Milestone-3 T0+9months	12.5	**Iteration 3:** a) Geometry clean up for **config. 3** b) Assist in Aero mesh generation c) Force and moment comparison on CFD mesh and Aeromesh generated by loads team d) Generate deck for load computation e) Assist in the load computation f) report generation and other Activities similar to config.1
4	Milestone-4 T0+12months	12.5	**Iteration 4:** a) Geometry clean up for **config. 4** b) Assist in Aero mesh generation c) Force and moment comparison on CFD mesh and Aeromesh generated by loads team d) Generate deck for load computation e) Assist in the load computation f) report generation and other Activities similar to config.1

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5	Milestone-5 T0+15months	12.5	**Iteration 5:** a) Geometry clean up for **config. 5** b) Assist in Aero mesh generation c) Force and moment comparison on CFD mesh and Aeromesh generated by loads team d) Generate deck for load computation e) Assist in the load computation f) report generation and other Activities similar to config.1
6	Milestone-6 T0+18months	12.5	**Iteration 6:** a) Geometry clean up for **config. 6** b) Assist in Aero mesh generation c) Force and moment comparison on CFD mesh and Aeromesh generated by loads team d) Generate deck for load computation e) Assist in the load computation f) report generation and other Activities similar to config.1

| 7 | Milestone-7

 T0+21months | 12.5 | **Iteration 7:**
 a) Geometry clean up for **config. 7**
 b) Assist in Aero mesh generation <br> c) Force and moment comparison on CFD mesh and Aeromesh generated by loads team <br> d) Generate deck for load computation <br> e) Assist in the load computation <br> f) report generation <br> and other Activities similar to config.1 |
| 8 | Milestone-8

 T0+24months | 12.5 | **Iteration 8:**
 a) Geometry clean up for **config. 8**
 b) Assist in Aero mesh generation <br> c) Force and moment comparison on CFD mesh and Aeromesh generated by loads team <br> d) Generate deck for load computation <br> e) Assist in the load computation <br> f) report generation <br> and other Activities similar to config.1 |

Note: Details of iterations above shall be shared in pre-bid meetings.

4.5 Proposed team structure

Minimum Two(2) resource Mechanical/Aeronautical Engineers, with 2+ years' experience in the following areas as given below, is required.

a. Experience in 3D and 2D mesh generation using Hypermesh/MSC PATRAN
b. Cleaning up of geometry using Hypermesh/MSC PATRAN
c. Input Deck pre-processing in MSC PATRAN/Hypermesh/text editor
d. Post processing using MSC Patran and in-house MATLAB/Python scripts
e. Report preparation in Microsoft word.

2. Academic Qualifications:
    a)Essential : Engineers deployed for this work shall have first class degree in B.E/B. Tech in Aeronautical / Mechanical from recognized universities

    b)Desirable : ME/M Tech in Aeronautical / Mechanical from recognized universities

5. Evaluation by Acquirer

5.1 Screening of team members:

i.   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.

ii.   Engineer shall be interviewed by ADA for technical suitability for this project.

5.2 Replacement:

It is required to have the same engineer throughout the duration of this project. However, in case of change/replacement, advance information (before 1 month) 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 has to replace the existing engineer with an overlap of minimum 3 weeks for smooth handing over of tasks.