

**Office of the Director General of Civil Aviation
Technical Centre, Opp. Safdarjung Airport
New Delhi - 110003**

TENDER NOTICE

Subject: - Procurement of “Ruggedised Portable Ground Support Equipment (RPGSE) & its Peripherals, Flight Data Recorder Downloading/ Engineering unit conversion/FOQA and Animation Software.

TERMS & CONDITIONS

1. GENERAL:

Quotations are invited in sealed envelopes from the reputed Indian/ foreign manufacturer/developer of software for the development and supply of above mentioned items to Flight Recorder Lab of DGCA, New Delhi. The complete details of the hardware, software and its Technical specifications are available in Appendix – I to this tender.

2. SUBMISSION OF OFFERS:

- a. The quotation should be submitted directly by the original manufacturer/ developer of the software or its authorized dealer.
- b. The quotation should be submitted in a sealed cover with a superscription that Tender for and addressed to Shri R. CHINNADURAI, Director R&D, Director General of Civil Aviation, Opp. Safdarjung Airport New Delhi -110003.
- c. Quotation/ offer should be submitted in two separate sealed envelopes containing Techno-Commercial bid and Price bid, and these put in another sealed envelope.
- d. The Techno-Commercial offers must contain the Technical Leaflets / literature and complete specifications of the quoted model(s) of the item along with commercial terms & conditions.

3. Earnest Money:

- a) Each tender should be accompanied with an Earnest Money Deposit (EMD) of Rs. 1,00,000/- (Rupees one lakh Only) either in the form of DD or Pay Order drawn in

favor of “ Pay and Accounts office, O/o DGCA, New Delhi”. Those firms registered with DGS & D need not deposit EMD along with their tender, however they should produce their certificate of registration in original to the authorities and enclose copy of same along with tender form.

- b) **Collection of EMD of unsuccessful Bidders:** - EMD of unsuccessful bidders will be returned within the shortest possible time as much as practicable. The tenderer shall have no right for demand for interest on the earnest money.

4. DUE & OPENING DATES:

The Offer / Quotations must reach this office within thirty days from the date of advertisement in news papers and up to 1600 HRS of the last working day. The Quotations/Technical bids will be opened at 11.00 P.M on next working day in the presence of bidders, who wish to present themselves at the time of opening of tender. The price bids of two bid tender system shall be opened after technical evaluation of technical bids. The date of opening of price bids shall be informed to the bidders found suitable in technical evaluation.

5. NO ADVANCE PAYMENT:

No advance payment will be made to any supplier.

6. Documents to be attached to tenders:

The following particulars should also be furnished by the Indian Agents/ foreign developers/manufacturers:

1. The precise relationship between the foreign Manufacturer / Principal and their Indian Agents.
2. Pay Order/DD of EMD of Rs. 10,0000/- (Rupees one lakh Only), if applicable.
3. Attested copy of DGS & D registration certificate, if applicable.
4. Copy of Registration with Sales Tax department.
5. Evidence to show the particular software in full or in part functioning in any airline or govt. bodies. A certificate of satisfactory functioning shall be desirable.
6. Brochures/manuals of the software/RPGSE etc.. may be attached with the tender document.
7. Identity proof of the proprietor/ Karta/ POA holder..

7. PRICES:

- a. The prices should be quoted F.O.R at destination in Indian Rupees inclusive of packing, forwarding, handling, insurance, documentation, installation, integration of bought out items, commissioning and training etc. and all taxes. The tenderer should

clearly indicate the break-up of prices viz. Net F.O.B/F.A.S. value, insurance, freight, integration of BOIs supported by manufactures /developer.

- b. Custom clearance, if any and all necessary procedures have to be done by Vendors including any financial implications.
- c. Any increase or decrease in the custom duty by the reason of the variation in the rate of exchange or any other reason will be entertained.

8. REASONABILITY OF PRICES:

Please quote best minimum prices applicable for a Research institution leaving no scope for any further negotiations on prices.

9. SPECIFICATIONS:

Specifications are basic essence of the product. It must be ensured that the offers must be strictly as per our specifications. At the same time it must be kept in mind that merely copying our specifications in the quotation shall not make the parties eligible for consideration of the quotation. A quotation has to be supported with the printed technical leaflet/ literature of the quoted model of the item by the quoting party/manufacturer and the specifications mentioned in the quotation must be reflected / supported by the printed technical leaflet/literature. Therefore the model quoted invariably be highlighted in the leaflet/literature enclosed with the quotation. Non-compliance of the above shall be treated as incomplete/ ambiguous and the offer can be ignored without giving an opportunity for clarification / negotiation etc. to the quoting party.

10. ANNUAL MAINTENANCE CHARGES:

The party must mention in the quotation, the rate/amount of annual maintenance charges, if we opt for maintenance contract for three years after the expiry of the warranty/ Guarantee period. This is mandatory to mention.

11. COMPLIANCE STATEMENTS:

- a) Bidders must submit the duly filled in Compliance Statement of Technical specifications with each point as required and as given in Appendix-II of our tender. The deviations, if any, from the tendered specifications should be clearly brought in the statement. Technical literature/ leaflet showing the compliance of the specification may be attached with the quotation.
- b) Similarly, the Compliance Statement of Terms & Conditions of the tender may also be furnished, as given in Appendix - III.
- c) The firms are advised to submit both the compliance statements essentially along with their quotation failing which their offer may not be considered.

12. PERIOD OF DELIVERY:

The delivery period is the essence of supply; hence it must be indicated specifically in the quotation.

13. PAYMENT CONDITION:

The payment towards the items as mentioned in Annexure - I of technical specifications will be made on submission of pre-receipted Bill and the ninety percent of the cost of self developed software will be made only after satisfactory installation, commissioning, training and performance of the equipment at 'Flight Recorder Lab, DGCA, New Delhi and after certification by our technical expert. The left out 10% of self developed software will only be released near the end of guarantee period.

14. COMMENCEMENT OF WARRANTY PERIOD:

The warranty period of an item shall commence from the date of receipt of the item in good working condition and satisfactory installation/ commissioning/ demonstration at the lab site in DGCA, New Delhi. The warranty period shall be extended for the period of delay in satisfactory installation and delay in warranty services.

15. INSTALLATION:

The equipment should be installed/ commissioned and demonstrated, by the supplier at the lab immediately but in any case within one month after receipt of the item in the lab and the same will be put under operation to the satisfaction of our technical expert who will test the performance of the equipment. No separate charges for installation etc. will be paid to the party beyond the quoted prices.

16. GUARANTEE:

- a) The entire product must be guaranteed/ warranted for a period of at least one year from the date of its satisfactory installation against all manufacturing defects. If the equipment is found defective during this period the whole equipment or part thereof will have to be replaced/ repaired by the supplier free of cost at the lab. or at site of the supplier for which 'to and fro' expenses will be borne by the supplier.
- b) Guarantee that they will supply the spare parts, if and when required on agreed basis for an agreed price. The agreed basis could be and including but without limitation an agreed discount on the catalogue price or an agreed percentage of profit on landed cost.

- c) Warranty to the effect that before going out of production for the spare parts they will give adequate advance notice to the purchaser of the equipment so that the later may undertake the balance of lifetime requirements.

17. Bought out items:

All the hardware and software as mentioned in Annex – I of technical specification must be sourced from OEM manufacturer or its authorized dealers in new and unused condition, evidence to this effect may be produced.

18. After Sales Services:

It should be clearly mentioned in the quotation whether the after sales services during and after the completion of warranty shall be provided directly by the supplier or their authorized agent/ representative. Terms of the after sales services, if any, may be mentioned in the offer. The supplier will give an undertaking for the after sales service of the combined product for a period of seven year from the date of installation and satisfactory functioning in non judicial stamp paper duly attested by a Govt. approved Notary.

19. Inspection:

The inspection of the system will be done by our technical expert in the presence of firm representative.

20. Users List:

The list of user s of the product in full or in part along with the complete name, address & contact numbers of the user organizations/persons may be submitted with the quotation along with the performance certificates from all/some of them.

21. Training:

Our Scientist/Technical persons should be trained by the supplier at the lab site free of cost.

22. VALIDITY OF OFFER:

Your quotation shall remain open for acceptance for six months from the date of opening of the Tender. No changes in prices will be acceptable in any condition after opening of tender till the validity of the offer or execution of the order whichever is later.

23. Forfeiture of earnest money

The tender submitted by tenderer will be final. Non compliance with the terms and conditions or delay in implementation of the project due to reasons other than

natural will not be acceptable to DGCA and which will result in forfeiture of earnest money deposit.

24. Late / Delayed / Unsolicited Quotation:

Late or delayed/ unsolicited quotations/ offers shall not be considered at all. Post tender revision / corrections shall not be considered.

25. Acceptance or Rejection of offer:

This office reserves the right to accept or reject or postpone any quotation/ tender in part or full without assigning any reasons thereof.

26. Page numbering & signatures:

Your offer should be a page numbered and signed by an authorized signatory giving his / her name below the signature.

27. Interim Enquiries:

No interim enquires will be attended.

N.B

Tenderers which do not comply with the above stipulations are liable to be ignored.

(R. CHINNADURAI)
Director R&D, DGCA

APPENDIX – II

COMPLIANCE STATEMENT OF TECHNICAL SPECIFICATIONS

NOTE:

1. Quotation may not be considered without submission of this format.
2. If a particular question is not at all applicable, please write NA in compliance part in Col. No.4 below.
3. Kindly see the relevant terms & conditions of the tender document as mentioned in Col. No. 3 in each question before replying to the questions mentioned in Col. 2 below).

| No | Terms & condition of Tender document | Whether acceptable (say 'Yes' or 'No') | Deviation from tender terms, if any, with reasons for noncompliance or alternative condition quoted for |
|----|--|--|---|
| 1 | 2 | 4 | 5 |
| 1 | a) Whether the quotation includes patented software and hardware from M/s Honeywell, USA. | | |
| 2 | Whether quote for hardware from other sources as mentioned annexure –I is enclosed? | | |
| 3 | a) Whether quote for each a/c as mentioned in Annexure –II of the tender is enclosed. | | |
| 4 | Whether the basic software module is separate from a/c configurations? | | |
| | Whether you have access to all required publications/FDRPL of each a/c manufacturer and you can configure the software for all a/c as mentioned in Annexure –II? | | |
| 5 | Whether your software have all modules as mentioned at different paras? | | |
| 6 | Whether the software has Graphical Plot, Scrolling Graph Display, Manual scrolling display, Raw data | | |

| | | | |
|---|---|--|--|
| | display etc.? | | |
| 7 | Whether animation module of software can accept raw data/engineering data for real time display? | | |
| 8 | Whether all airport models of India and international airports of the world is included. | | |
| | Jepperson chart for entirety of India is included. | | |
| 9 | Can you conduct demonstration of the subject software as per the specification in full or in part in DGCA office on demand? | | |

Signature of the authorized signatory _____

Name of the signatory _____

Designation _____

Name & Seal of the quoting party _____

Dated _____

APPENDIX –III

COMPLIANCE STATEMENT OF TENDER TERMS & CONDITIONS

NOTE:

1. Quotation may not be considered without submission of this format.
2. If a particular question is not at all applicable, please write NA in compliance part in Col. No.4 below.
3. Kindly see the relevant terms & conditions of the tender document as mentioned in Col. No. 3 in each question before replying to the questions mentioned in Col. 2 below).

| No | Terms & condition of Tender document | Relevant Clause No. of the tender terms & conditions of the tender | Whether acceptable (say 'Yes' or 'No') | Deviation from tender terms, if any, with reasons for noncompliance or alternative condition quoted for |
|----|--|--|--|---|
| 1 | 2 | 3 | 4 | 5 |
| 1 | a) Whether quotation is direct from the manufacturer /developer or from their Indian agent. | Para 2 sub para a | | |
| 2 | a) Whether the Techno-commercial and price bids have been kept in separate envelopes duly marked with "Techno-commercial Bid" and "Price Bids" respectively. | Para 2 sub para c | | |
| 3 | Whether techno-commercial Bid contains technical literature/leaflets, detailed specifications & commercial terms & conditions. | Para 2 sub para d | | |
| 4 | a) Whether EMD in DD/PO is enclosed? | Para 3 sub para a | | |
| | b) If not DGS&D registration certificate is enclosed. | Para 3 sub para a | | |

| | | | | |
|----|---|--------------------|--|--|
| 4 | A) Whether prices are quoted on F.O.R up to Lab in INR | Para 7 sub para a | | |
| | b) Whether specific amounts for each component of the tender is mentioned separately. | Para 7 sub para a | | |
| 5 | Whether rates / amount of AMC after the warranty period is over has been mentioned. | Para 10 | | |
| 6 | Whether all the hardware as required is sourced directly from manufacturer and what evidence to show that items are new and procured from the OEM manufacturer is enclosed. | Para 17 | | |
| 7 | Whether compliance statement of Technical specifications has been attached with the quotation | Appendix -II | | |
| 8 | Whether the user list and performance certificate is attached with the quotation | Para 20 | | |
| 9 | Printed technical literature/leaflets of quoted items have been submitted | Para 9 | | |
| 10 | Whether the delivery period for supply of the items has been mentioned | Para 12 | | |
| 11 | Do you agree about the date of commencement of warranty period & its extension if necessary. | Para 16 sub para a | | |
| 12 | a) Have you mentioned that the firm shall install/ commission and demonstrate the equipment at lab. FREE OF COST | Para 16 | | |

| | | | | |
|----|---|------------------------|--|--|
| | b) Have you mentioned that free training for operation and maintenance for the staff of lab Will be given on site free of cost? | Para 21 | | |
| 13 | Have you mentioned the guarantee period in your quotation and do you agree with guaranty clause? | Para 16 sub para b & c | | |
| 14 | After Sales services | Para 18 | | |
| 15 | Have you mentioned the validity period of the quotation is for a period of six months. | Para 22 | | |
| 16 | a) Whether all the pages have been page numbered? | Para 26 | | |
| | b) Whether quotation has been signed and designation & name of signatory mentioned. | Para 26 | | |
| 17 | Have you read the clause regarding forfeiture of Earnest Money deposited by you and is it acceptable to you? | Para 23 | | |
| 18 | Please confirm that you have read all the instructions carefully and have complied with the instructions accordingly. | | | |

Signature of the authorized signatory _____

Name of the signatory _____

Designation _____

Name & Seal of the quoting party _____

Dated _____

Appendix - I

F. No. 15-1/2005-RD

Technical Specifications for procurement of Ruggedised Portable Ground Support Equipment (RPGSE) & its Peripherals, Flight Data Recorder Downloading/engineering unit conversion/FOQA and Animation Software.

The Technical specification of each component of the proposal is listed below:

| SI No | Description | Location |
|-------|--|----------------|
| 1) | (1) List of patented hardware/software required from M/s Honey Well, USA to download recorders of M/s Honey Well make and to be integrated with main software. (2) List of hardware to be procured from other sources and integrated with main software | Annexure - I |
| 2) | List of a/c for which the main software to be configured for FDR downloading/engineering unit conversion/FOQA and Animation . | Annexure -II |
| 2) | Software :- (1) General requirements (2) Engineering unit conversion from FDR data (3) Analysis of parameter exceedance (FOQA). (4) Requirements for real time Animation (5) CVR Audio analysis Software requirements | Annexure - III |
| 3) | Integration of OEM hardware and developed software to the needs of DGCA | Annexure - IV |
| 4) | Terms and Conditions | Annexure - V |

Annexure - 1

List of Software and Hardware required from M/S Honeywell USA for integrating with main software

| Sl. No. | Part No | Item Description | SSFDR | SSCVR | ARFDR | ARCVR | AR Comb. | DVDR |
|---------|--------------|------------------|-------|-------|-------|-------|----------|------|
| 1 | 952-0035-002 | RPGSE | YES | YES | YES | YES | YES | YES |
| 2 | 964-0046-xxx | HHDLU | YES | | YES | | YES | YES |
| 3 | 704-2864-021 | Cable | YES | | | | | |
| 4 | 704-2863-001 | Cable | | YES | | | | YES |
| 5 | 704-2864-001 | Cable | | | YES | | YES | YES |
| 6 | 704-2863-041 | Cable | | | YES | YES | YES | |
| 7 | 998-3412-501 | Software | YES | | YES | | YES | YES |
| 8 | 998-3414-501 | Software | | YES | | YES | YES | YES |
| 9 | 998-2999-501 | Software | YES | | YES | | YES | YES |
| 10 | 998-3249-502 | Software | YES | | YES | | YES | YES |
| 11 | 998-3413-501 | Software | | | | | | YES |

Hardware/ Software from other sources required to be integrated with main software

| Sl. No. | Part No | Item Description |
|---------|---|--|
| 01 | SB Audigy 4 Pro | Creative Sound Card for PC applications |
| 02 | Hitach/LG/Samsung/ | 32" Plasma screen with TV/PC Monitor inputs for animation purpose |
| 03 | Jepperson Chart | Entirety of India |
| 04 | All Airports models of India and international Airports of world. | With a resolution of 1metre on all Indian and International airports |
| 05 | A/c models including Instrument panel of each a/c | Of all a/c as mentioned in Annexure –II of tender |
| 06 | (1) Terrain map of world. (2) Indian territory. | (1) With a resolution of 10km. (2) With a resolution of 1 km |

Annexure – II

| S.No | A/c Description | Remarks |
|--------------------------|-----------------------|---------|
| Boeing Airplanes | | |
| | B-737 family | |
| | B-747 family | |
| | B-757 family | |
| | B-767 family | |
| | B-777 family | |
| Air bus Airplanes | | |
| | A-319, A-320, A -321 | |
| | A -330, A - 340 | |
| | A -380 | |
| Small Airplanes | | |
| | Embraer family | |
| | ATR family | |
| | CRJ family | |
| | Do-228. | |
| | Cessna Citation | |
| | Beech Aircraft family | |
| | Gulf stream variants | |
| | Lear Jet Variants | |
| Helicopters | | |
| | Dauphin | |
| | Eurocopter family | |
| | MI - 172 | |
| | CL-600 | |

Note :- All a/c families could be fitted with any combination of recorders and FDIU

Annexure – III

The software should conform to the following requirements:

1.0 General Requirements :

- 1.1 The system should be a complete Ground Data Replay and Analysis System (GDRAS) that should import and download raw binary data virtually from all flight data recorders in use today. It should be fully integrated open architecture suite of interactive flight data analysis software tool ***primarily designed for accident investigation for use by authorities*** and also for carrying out airline flight data analysis programmes.
- 1.2 The system should be fully user configurable, to handle routine FOQA events and analysis as well as the complete requirements of a major accident investigation. The supplier should arrange access to this office to various aircraft databases, models, instruments display and other information systems.
- 1.3 The system should be able to detect de-coding problems such as data drop- outs or synchronization losses, and in such cases should be able to automatically archive the raw signal to allow subsequent analysis.
- 1.4 The system should have robust decoding algorithms with no constraint of running in real time and should allow the user to view the signal and edit the de-coded bit stream data interactively.
- 1.5 The system should have a wide aircraft data base management programme, which provides tools needed to define an aircraft's FDR configuration (data frame layouts) and develop the engineering units conversation equations. The system application package should accept the original recorded data in its binary format directly and convert to engineering units.
- 1.6 The system should accept all types of solid state and tape version recorder with recording formats ARINC 573, 717, 747, 541A and MIL STD 1553. Word rate should vary from 64 to 1024 wps depending upon kind of recorders under analysis.

2.0 Engineering Unit Data conversion from FDR Data :-

2.1 The package should have the following features:

- The package should be able to accept and interpret various combinations of FDAU/SSFDR/FDR.
- Analysis of engineering data should be possible in tabulated, graphical and dual format with zoom input/ output capability.

- Adding and dropping of parameters during analysis “online”.
- GroupWise analysis should be possible.
- All graphs should have appropriate legends and scale shown along with the graphs.
- Facility to capture and save current views as data base file.
- Should be able to print the engineering data directly from the analysis view.
- Facility to the back up of entire database in user definable format.
- Different resolutions in analysis view.
- Variability of formats and layouts of reports.
- Under data analysis the system should provide variety of functions including data smoothing, interpolation, differentiation, integration and calculation function as well as programmed functions.
- The package should be able to evaluate and calculate aircraft Take off/Landing/ approach and cruising flight performances data for any desired airfield and sector.

2.2 Display Module:

- This shall provide an option to select parameters for each type of replay.
- Traversing through different types of display shall be provided.

- ✓ Alpha Numeric Scrolling Display.
- ✓ Graphical Plot.
- ✓ Graphical Display
- ✓ Scrolling Graph Display
- ✓ Manual scrolling display
- ✓ Raw data display

2.3 Alpha Numeric Scrolling Display module: -

- Raw data is converted in engineering format and replayed on the screen.
- There shall be an option to select any particular range of flight time.
- Shall have an option to view decoded values of parameters display for every second.
 - It shall have different options like
 - ✓ Check for Slow/Fast selection and accordingly the replay is executed.
 - ✓ Check for Pause/Resume selection and accordingly the execution is controlled.
 - ✓ Check for forward/Reverse display of data and accordingly the processing is updated.
 - ✓ Saving of replay parameters in text file format.
 - ✓ Print for replay of selected parameters.

2.4 Graphical Plot module:

- Plotting Engineering values of parameters in graphical mode w.r.t Start and stop time.
- Option to select graphical plot in two different modes:
 - ✔ Entire Flight Path
 - ✔ Path in sections
- Entire flight path gives the graphical view of parameters from selected start time to the maximum relative time of the binary raw data.
- Path in sections shall be provided to view flight path from selected time.
- Option to select required *From time* and *To time*.
- Option to select minimum and maximum scale values for each parameter to plot X and Y coordinates.
- After selecting parameters range an option shall be provided for reselection of time, in which the start time on X coordinate can be changed during graphical plot: -
 - ✔ Enter time by user
 - ✔ Relative time
 - ✔ GMT
- Shall have an option to select Pause/Resume for plotting
- New time option shall be provided for plotting the graph from desired time.
- Graphical Plot of parameters shall be possible to vary in Faster/Slower mode.
- Shall provide facility to select print options for the graphical plot along with the title: -
 1. Print only plot
 2. Print only with data
- Shall provide an option to select print colors: -
 - ✔ Black and White
 - ✔ Color

2.5 **Scrolling Graphical Display:**

- Shall provide to view the variation of all selected group parameters from flight Takeoff time to Touchdown time with zooming effect.
- Shall provide Faster/Slower option to check the graphical display of parameters corresponding to engineering values.
- Shall have facility to view display of relative time, maximum value on Y-Axis and engineering values of respective parameters
- Pause at any time and Resume back.
- Replay in forward and reverse direction option shall be provided.

2.6 **Graphical Display Module:**

- This shall provide the user to view static display of parameters from

beginning to end of flight time (Takeoff to touchdown relative time) and can observe the variation of parameter values.

- Shall provide an option to view the relative time of that selected flight.
- Graphical display is synchronized to three parameters.

2.7 **Manual Scrolling Display:**

Shall provide the complete display of parameters selected in that group for the relative time of that selected flight.

2.8 **Raw Data Display:**

- Shall provide an option to view the real value of each parameter before decoding it into engineering format.
- Shall provide an option to save the display in text file format.
- Shall provide facility to pause the display at any time and resume back
- Forward/Reverse option should be provided to update the display.
- Slow/Fast option shall be checked and accordingly to view the execution
- Should have print option to take prints of selected parameters for the respective flight time of raw data.

3.0 **Analysis of parameter Exceedence (FOQA) : -**

3.2 The software should have following features:

1. Ability to limit capability and incorporate changes in the exceedance level and definition of event only to authorized administrator of this office.
2. To perform FOQA on computed parameters also.
3. To carry out analysis of selected phase of selected flight, set of flights, set of phases of flights and to output result in tabulated form in minimum time possible.
4. From the result table, capability to go to any data file consisting of the reported exceedences or event and to print that page only.
5. To carry out *TREND ANALYSIS* and to produce comprehensive analytical report.
6. To create extensive statistical database, from the large volume of flight data, about aircraft system performance and crew handling characteristics.
7. To check to see if any abnormal trend is setting in on the search parameter defined by the users.
- 8.

3.3 The creep study options are to be provided for the following:

9. Pilot
10. Co-pilot
11. Type of exceedence category.
12. Type of event category.
13. Flight sector wise.
14. Date.
15. Aircraft wise/fleet wise.
16. Any combination of the above.

3.5 TOOLS FOR FLIGHT OPERATION AND QUALITY ASSURANCE

he Following Options shall be provided

Aircraft Selection -----Specifies the Aircraft Type to be analyzed.

FDAU Selection -----Specify the type of FDAU fitted on particular a/c

Update Database -----Configuration of Aircraft Parameters.

Analysis -----Analysis of Flight Data

Reports -----Generation of Flight History Reports

3.5.1 Aircraft Selection module:

There shall be an option to provide selection of an Aircraft, to which the flight data has to be analyzed and it shall provide the facility for selecting different configurations of an Aircraft Signature.

3.5.2 Update Database module:

- *The Configuration tool shall provide following details: -*
- It shall have an option to provide the facility for adding, deleting, updating and saving new configuration and also to update the existing configuration of an Aircraft signature.
- It shall have the list of details for configuration
 - ✓ Aircraft Configuration.
 - ✓ Parameter configuration provides– defining the data
 - ✓ Format, Output range, resolution and algorithm for EU (Engineering Unit) conversion.
 - ✓ Flight History configuration.

- ✔ Acceleration configuration
- ✔ Look Up Tables Configuration.
- ✔ Phase configuration.
- ✔ Events configuration.

3.5.3 Analysis Module

This analysis tool should contain the following facilities: –

Processing the data

- Shall have an option to select raw data (BIN) file to process
- Shall have an option to make a manual entry of year.
- Should contain display of processed flight history data in table form with following details for each sector of the flight.
 - ✔ Serial number of the flight
 - ✔ Relative time
 - ✔ Flight Event like Take-Off and Touch-Down
 - ✔ Aircraft Registration
 - ✔ Date in MM: DD: YY Format
 - ✔ Flight number
 - ✔ GMT
 - ✔ Weight
 - ✔ From Station
 - ✔ To Station
- Print option shall be provided for printing of flight history details after processing the entire raw data file.
- Save option shall be provided for the flight history details on an Excel Sheet.
- Clipping option shall be provided for clipping of raw data, i.e. length of raw data can be reduced to required time interval where selection of relative time shall be provided.
- Display option shall be provided to display parameters in Engineering format.
- Exceedence option shall be provided to detect events of selected flight.
- PhaseLog option shall be provided to detect phases of selected flight.
- Display time and relative time option shall be provided.
- Sector analysis option shall be provided when there is no proper flight history generation.
- Animation option shall be provided for simulation of an aircraft.

Exceedence module

- Exceedence is a process of recognizing flight parameters in terms of their operating condition and crossing the pre-defined values in the view of the persistence of events for a definite time.
- Exceedence for the selected flight shall be provided from the flight history table listed.
- Exceedence for all the flights shall be provided in table form.
- Exceedence shall generate the occurrence of events with severity like LOW (G), MEDIUM (Y) and HIGH(R) with Relative time information.
- Shall provide the facility of accepting and rejecting events when it crosses the event limit and can mention the reason for acceptance and rejection of events.
- This shall have the facility to save the exceedence report on an excel sheet.
- Should contain Printing option of event history.
- Should contain Display of parameters corresponding to the selected event.
- Updating Master database shall have the details of event, exceedance with levels time, flight number, registration and Relative time.

3.5.4 Reports Module:

Report module is for the final reports of flights generated from the raw data. This provides to facilitate the user to analyze the aircraft performance and measure the corrective action if required. This will be used for the statistical analysis of events.

This Module shall bring up with following statistical reports:

- Type of report selection shall be provided
 - ✓ Event Rate Report
 - ✓ Trend Rate report
 - ✓ Trend Analysis report
 - ✓ Counseling Report
 - ✓ Daily report
- Shall provide option to select Report Type
- There shall be an option to accept Aircraft type from Graphical user interface.
- Option to accept Aircraft Configuration Type
- Shall provide an option for selection of Period.
- Selection of Aircraft registration number
- Shall provide option to select events and group them for report generation.
- Shall provide time selection like From time and To time
- Selection of threshold value.
- Selection of type of results required to generate reports like
 - ✓ Actual

- ✓ Taxi out
- ✓ Take off Roll
- ✓ Take off
- ✓ Climb
- ✓ Cruise
- ✓ Descent
- ✓ Landing
- ✓ Landing roll
- ✓ Taxi In
- ✓ Parking
- ✓ Engine Shut off
- This shall have the facility for replay of the selected parameters corresponding to phases.

3.8 Sector Analysis Module:

This shall be processed when exceedences of the flight are not detected.

This shall provide exceedence in two modes. They are

- ✓ For the whole flights monitored.
- ✓ For the relative time based monitoring.
- ✓ Sector analysis shall provide information about the event occurrence at that particular relative time, in the table form.
 - ✓ Relative time
 - ✓ Event code
 - ✓ Event description
 - ✓ Severity level
 - ✓ Actual value
 - ✓ Event limit
 - ✓ Total no of times each event occurred
 - ✓ From station
 - ✓ To station
- This module shall provide display of sector parameters.
- Shall provide an option to save sector analysis report on an excel sheet.

3.9 D-Animation Module:

This should contain simulation of an aircraft when the data is provided to it.

This shall give clear picture of an Aircraft movement corresponding to parameters display.

This shall provide cockpit view, tracking map-recorded video.

3.10 Event Rate Report:

3.10.1 There shall be an option to view the analytical statistics of selected events, where the user shall specify the time duration. Selection of From and To date shall have this format (DD: MM: YY).

The report generated shall be seen in two formats:

Graphical mode of report represented in chart form like BAR, PIE, 2DLINE, etc shall have severity level details with the different colors like Red (HIGH), Yellow (MEDIUM), Green (LOW).

2. The user shall view text format report.

- Y-axis gives the maximum number of times each selected event has occurred.
- X-axis gives the event name.

3.11

Trend rate Report:

- This shall provide details about the trend of selected aircraft with the selected time duration. Performance of an aircraft can be analyzed in the form of statistics.
- Four types Trend rate report shall be generated.
 - ▼ Yearly Report
 - ▼ Half yearly Report
 - ▼ Quarterly Report
 - ▼ Monthly Report
- Shall provide the statistics of aircraft trends towards the selected events in the yearly, half yearly, quarterly, monthly basis.
- Graphical report, which is represented in Chart form, shall give summation of each selected event occurred in that year.
- Y-axis specifies total no of times each event occurred.
- X-axis specifies the selection of period
- The text format shall provide an option to view in which period an event has occurred.

3.12

Trend Analysis Report:

- This shall give details about the trend of selected aircraft with the selected time duration. Aircraft performance can be analyzed in the form of statistics.
- Trend analysis report shall give the clear view of detection of event in the selected period.
- Four types Trend analysis report shall be generated.
 - ▼ Yearly Report
 - ▼ Half yearly Report
 - ▼ Quarterly Report
 - ▼ Monthly Report
- Yearly, Half yearly, Quaterly, Monthly trend report can be generated in the *textual format*

- Shall provide the statistics of aircraft trends towards the selected events in the yearly, half yearly, quarterly, monthly basis and can take respective corrective action
- This textual format shall provide the alert values of selected exceedences with periodic details
- Summation of all severity levels for all selected events

3.13 **Daily Report:**

- Shall provide analytical statistics of flight events generated for current day when the raw data file is processed.
- Shall provide an option to show report for selected new date if details of events present in the master database.
- Textual format of report display shall be provided.

3.14 **Counseling Report:**

Counsel report shall give measure of pilot's performance tests. critical events summary can be viewed for the discussion with the raw data for further processing.

This shall be viewed in textual format with the actual result selection. This gives following details

Event Name
Event code
Flight No/Date
Sector/Reg. No.
File/Subfile
Description of counsel Event

3.15 **Browsing The Master EMR Module:**

Master EMR stores all the fleets' information of the processed data.

Selection of period
Selection of AC Reg No.

Browsing the Master EMR gives the No of Flights, Date, and Total Air time, GMT, Relative Takeoff and Touchdown for each aircraft in the table form.

Compares the performance of Aircraft by maximum and minimum event flight.

This shall give information about the statistics of events occurred corresponding to selection of A/C Reg No and has the details of severity level, event time in the table form.

Shall provide to see number of events occurred with high and low severity levels.

Shall provide information about average number of events per flight.

3.16 Add/Edit company Details

- Shall have these facilities to save/Edit Company detail into the Master EMR and every report gets heading accordingly.

Company Name.

Address

City

State

Country

Postal/zip

3.17 Cycle Data Report

For every Aircraft registration, the schedule of flights for every month/Date can be planned; in view of that report generation shall be with actual flight verses schedule flight.

4.0 Real time Animation

4.1 General requirements

- To create real time interactive high fidelity graphical depiction of flight data without need for extensive programming.
- The system should have event detection and search engine routines.
- To accept both engineering units file (spread sheet) as well as raw binary data (ARINC) with 'on the fly' engineering unit transcription.
- 3D aircraft models to be provided for the a/c as mentioned in Annexure – II. Provision to include new models of aircraft/helicopters as and when needed.
- Airport model up to 100km periphery of all Indian and International airports.
- Industry standard 3D Models format import (object).
- Complete cockpit view of all varieties of a/c.
- Fully customizable Instrument panels and display.
- EFIS/PRIMARY FLIGHT Display/ Heads up display.
- Extensive 3D flight path reconstruction and analysis tools.
- Ability to display multiple aircraft and on the fly time adjustment.
- Runway model editor with lighting generator and obstacle generator.
- CVR/ATC voice & Integrated Digital Audio Support with synchronization tools.
- Outputs Industry standard avi video files to dissemination to another analysis system.

- Create templates, which allow for unlimited pre configured presentations.
- To accept digital terrain elevation data for full 3D scene depiction. Terrain data with 100m resolution of India and 1 km resolution of the world should be supplied along.
- To accept satellite imagery that can be applied to terrain elevation data.
- Subtitles features to incorporate and synchronic transcript, allowing color-coding and display attributes arranged by users.
- Multiple windows with different views of the same scene.
- Automatic and selectable interpolation for each parameter.
- While creating 3-D simulation it should be possible to create background conditions depending upon the input metrological conditions and eyewitness account.
- It should be possible to integrate CVR data with the FDR value and synchronize both the times together.
- All animation objects to be data driven to control translation, rotation, size, color etc.
- To display aircraft ground track on geo referenced navigation charts such as Jeppeson Charts Jepp view a/c position to more dynamically with support from latitude/longitude data) as location of the data changes, it should be possible to zoom and copy the picture.(Rights of use of Jeppeson chart should be defined and accounted).
- Unlimited cameras and placement (witness location, cockpit, chase, fly by view from a location fixed in space).
- Configurable contrails (color, length, predictive historical).
- Radar data acceptability.

4.2 Specifications expected from the software for its end use:

Demonstrate the virtual flight using DFDR data recorded during the flight.

The system shall be primarily used for FOQA activities and training of the crew personnel.

The system shall have full capabilities to demonstrate the complete flight path reconstruction and jeppesen overlay of the flight path.

The system shall demonstrate the landing profile of the aircraft along with the glide slope and localizer views.

It shall have full capability to demonstrate the flight performance with respect to the actual SOP (Standard Operating Procedures) and record the deviations of actual flight with SOP.

The software shall be user friendly to use and sufficient interfaces are provided to accommodate data of various types from different type of DFDR.

4.3 The views expected to be visualized using this software tool:

4.3.1 Flight path reconstruction

- Display the total flight of the aircraft from take off to touch down
 - Provision to select a flight or a section of the flight by giving proper time interval
- Movement of the aircraft body along with the entire three axes.
System option for zoom in or zoom out to look any of portion of the aircraft closely. T
Option for rotation for the camera angle to look the aircraft from different angle.
This operation to be performed by the use of mouse or key.

4.3.2 Avionics subsystems integration

EFIS display for aircraft attitude
heading information,
Engine parameters display,
Engine controls display
Stick movement. etc

Aircraft model adoption

Configuration of aircraft model and parameters

4.4 *Demonstration of aircraft dynamics (Takeoff & Landing Profiles)*

Animation software shall have capabilities to demonstrate

Aircraft dynamics **like pitch, roll and yaw movements.**
Surface movements, **like flaps, slats, rudder, ailerons, and change of magnetic heading.**
Landing gear transitions.

5.0 COCKPIT VOICE RECORDERT AUDIO ANALYSIS SOFTWARE

- 1, The four channel audio output of CVR should be captured, digitized and plotted simultaneously without any loss of quality.

2. Segment analysis capability should be available in the following manner ;
Speech segment analysis, Noise segment analysis
3. Analysis windows like Speech Enhancement/ Spectrum
Analysis/Time/Frequency etc.. should be made available.
4. User friendly filters may be provided like LP(low pass), HP (high
pass), BP (band pass) and BS (band stop). The respective responses
of the application of filters could be plotted for further manipulations.
5. The effect of each filter should be able to be depicted in various windows
such as Kaiser, Rectangular, Hamming, Hanning, Blackman etc..
and it should be automatically load the selected parameters on selection
of the concerned button.
6. The single action RECORD button should accepts the inputs of all four
for the time duration of recording and also the filename under
which the
recorded audio samples will be saved.. The time duration and the filename
under which the file has to be saved should be left for user.
7. One SELECT WAVFILE option may be made available to select a
wavfile from the list of wavfiles, which are present in the present directory..

Annexure - IV

Integration of OEM hardware with developed software to the requirements of DGCA.

The contracting firm should source all hardware from OEM supplier M/s Honey Well, USA in serviceable, new and unused conditions.

The firm should develop/outsource to develop the custom built software for all fleet of aircraft as mentioned in tender.

They should integrate the OEM hardware with the developed software, to its maximum utility.

Any discrepancy arises out of these integration will be the responsibility of the contracting firm.

Online updation should be possible from remote places and this should not cause any trouble to the total functionality of software/ H/W.

After integration, the total module should work as a single module.

Annexure -V

General Terms and Conditions: -

- The software package should be compatible with *WINDOWS XP/2000* and above operating system.
- The supplier should provide authentic user list with e-mail contact of particular specialists. Also documentary evidence in the form of letter/ certificate about use of their software by reputed agencies.
- The supplier should have trained customer support staff to provide continued technical/service support to keep the system operative.
- Training on operation cum investigation aspects should be given to officers of DGCA at the premises of DGCA/supplier for a period of two weeks.
- The system shall be installed by supplier in the O/o DGCA, New Delhi to satisfactory functioning.
- The payment terms should be clearly specified.
- A technical demonstration should be arranged at this office on mutually agreed convenient date, in which the validity of decoding should be proved by the vendor by suitably converting the same raw data using standard approved software.
- The supplier should provide updates of the software on the terms and conditions acceptable to this office.
- The vendor should provide warranty for at least 12 months for the integrity, accuracy and reliability of the software. The supplier shall be responsible for the satisfactory operation of the software package through the warranty period, no TA/DA will be given to the customer service executive.