GUIDELINES ON INCLUSION OF TECHNICAL AIRWORTHINESS REQUIREMENTS IN REQUEST FOR PROPOSAL (RFP)

CENTRE FOR MILITARY AIRWORHTINESS AND CERTIFICATION (CEMILAC)
DEFENCE R&D ORGANIZATION, MOD
MARATHAHALLI COLONY POST
BENGALURU-560037

Documentation Page

Document Classification	Unclassified
Document No.	
Issue	
Date of Issue	
Number Pages	(including the cover page)
Document Title	Guidelines on Inclusion of Technical Airworthiness Requirements in Request for Proposal (RFP)
Key Words	DDPMAS, IMTAR-21, Request for Proposal
Abstract	Main Contractors acquire subsystems, LRUs, Components and aero-materials from lower tier suppliers. During the acquisition process, the Main Contractors float Request for Proposals (RFPs or equivalent) to solicit potential D&D /Design-cum-Production-Partners. Based on techno-commercial evaluation, one or more suppliers are selected. It is important that the RFP includes the applicable airworthiness requirements. This will help the prospective suppliers to include the technical, commercial, effort, timelines and resources in their bids. This document brings out the various aspects to be included in the RFP.
Organization	
Distribution	
Prepared By	
Review by	
Approved by	

Revision History

Document Title	:	Guidelines on Inclusion of Technical Airworthiness Requirements in request for proposal (RFP)
Document Number	:	

Revision Number	Date	Approval	Remarks

Executive Summary

Guidelines on Inclusion of Technical Airworthiness Requirements in request for proposal (RFP)

Aircraft and their sub-system development involve highly integrated system engineering and supply chain management. In the traditional Aerospace ecosystem, OEMs and Tier-1/Tier-2/Tier-3 suppliers form the complete hierarchical supply chain.

During development phase of an air system or airborne store, a Main Contractor (*the organization in the supply chain which is the applicant for airworthiness certification*) acquire subsystems, sub-assemblies, LRUs, components from suppliers. Conventionally, the acquisition process commences with the Main Contractors floating Request for Proposal (RFPs) to solicit potential D&D /Design-cum-Production-Partners. Based on detailed and multi-stage techno-commercial evaluation, one or more suppliers may be selected for the prototype development and subsequent series production.

The main contractor would be the primary applicant for the certification of the product and is responsible to meet the airworthiness certification requirements laid down in IMTAR-21. Hence, it is important that the Main Contractor, includes the applicable Certification Requirements upfront in the Request for Proposal (RFP). This will help the prospective suppliers to be cognizant of the certification requirements at the time of bidding. The supplier can ensure that the submitted proposal complies with the certification norms, estimate the cost, effort, resources and timelines in a realistic manner. Once the supplier clearly understands the certification requirements during the bidding/contract finalization stage, the risks of time/cost overruns due to certification can be largely alleviated.

DDPMAS and IMTAR – 21 has stressed the importance of including the airworthiness certification requirements in the RFP in multiple sections of the document. This document gives more details of how airworthiness requirements are to be incorporated during RFP stage.

This document can be used by DRDO, DPSUs and other private industries that plan to outsource development of products that need to be certified by CEMILAC. This document can also be used by Indigenization Agencies (like SHQs, BRDs, NAYs,) which take up indigenous substitutions for the existing fleet .

Contents

1 Introduction

1.1 Purpose

Main Contractors outsource development of subsystems, assemblies, components to suppliers. The outsourcing process beings with requesting for proposals from prospective suppliers. It has been noticed that the Main Contractors either totally fail or inadequately capture the airworthiness requirements in the Request for Proposals (RFPs). This has led to technical non-compliances, cost deficiency and time overrun issues. In order to avoid such risks, it is imperative to incorporate the airworthiness certification requirements during the RFP stage so that the prospective suppliers can incorporate the technical and commercial aspects in their bids.

This document supplements DDPMAS and various regulations given in IMTAR – 21.

1.2 Scope

The scope of the document is to bring out the salient aspects of airworthiness requirements which the Main Contractors can include as technical requirements of RFP. Since the nature for airsystems/airborne stores cover a wide variety of domains and applications, it is not possible to enumerate product specific certification requirements. Every organization follow their enterprise specific guidelines / templates for preparing and floating the techno-commercial aspects of RFP and subsequent contract. Hence, this document will attempt to outline the overall requirements that can be included in the technical aspects of RFPs from an airworthiness perspective only.

This document can be used by DRDO, DPSUs and other private industries who plan to outsource development of airborne products that need to be certified by CEMILAC. This document can also be used by Indigenization Agencies (like SHQs, BRDs, NAYs) which take up indigenous substitutions for the existing fleet and want the certification to be carried out by CEMILAC.

This document may not be directly used for procurement of Air Systems (like aircraft, Helicopters, UAVs, Engines, Airlauched Missiles). The document is more suited for RFPs for avionics, electrical, payloads and mechanical items.

As per IMTAR-21, detailed certification requirements are tailored for specific items and captured as a part of ACC, TCB, TAB, ARD, Technical Specifications and Certification Plans. This document is ***NOT*** a substitute to ACC/TCB/TAB/ACP documents which form the basis for airworthiness certification. This guideline document essentially gives the generic and top-level details of what to be included in the technical aspects of RFP so as to comply with technical airworthiness requirements laid out in IMTAR-21.

The overall context of the RFP in certification is given in the flowchart in Figure – 1.

1.3 Structure of the Document

The document is arranged in the form of Airworthiness Certification Requirements, codified as, ***ACR-RFP***. Each ACR-RFP comprises of the Requirement Statement, Acceptable Means of Compliance (AMC) and Guidance Material (GM).

1.4 Applying the Document

RFP is a proprietary document of the Main Contractor for commercial purpose and is not a certification related artefact. Hence, the main contractor may include any technical and commercial contents in the RFP towards acquiring the product or service. If the main contractor intends to obtain certification from CEMILAC, for a military airborne product, the main contractor can use this document as a ***guidance material*** while preparing the RFP. Prior to formulating the RFP, the main contractor can approach CEMILAC and discuss the airworthiness requirements and capture them in the form of TCB/TAB/ACP/Tech Requirements document. These documents would be reviewed and approved by CEMILAC. Based on these documents, the main contractor can formulate the RFP.

If any project has detailed TCB/TAB/ACP/Tech Requirements document approved by CEMILAC, the requirements in those documents take precedence over the content in this guideline document.

A checklist (Annexure – 1) is included in this document which the author of an RFP can use to ensure that the key airworthiness requirements are captured in the RFP.

The document can also be used as a guideline for generation of RFP for procurement under DPM-2009. Towards that a sample template (Annexure – 2) is also enclosed based on Appendix C of DPM-2009.

It is reiterated that ***CEMILAC would neither review or approve RFPs of Main Contractor***. ***This Guideline document is not binding on the Main Contractor***.

1.5 Applicable Documents

1. DDPMAS Ver 1.0 Framework and Procedure for Design, Development and Production of Military Air systems and Airborne Stores dated Feb 2021.
2. IMTAR-21, Version 1.0 Indian Military Technical Airworthiness Requirements dated Feb 2021.
3. DPM-2009, Defence Procurement Manual -2009, (Revenue Procurement)

1.6 Definitions

a. **Design Organisation (DO)**

Design Organisations are organisations involved in the design & development and modification of Airborne Stores used in an Air System. DO shall be responsible for the through-life configuration management of the designed Air borne Stores. In context to this document, Airborne Store refers to the Avionics items / Ground Operational System (GOS) of UAS.

Ref : IMTAR - 21

b. **FRACAS (Failure Reporting Analysis & Corrective Action System)**

FRACAS is a tool established to identify and correct deficiencies in equipment and thus prevent further occurrence of these deficiencies. It is based upon the systematic approach of reporting and analysis of failures during manufacturing, inspection, test and operational use. The closed-loop feature of FRACAS requires that the information obtained during the failure analysis be disseminated to all of the stakeholders.

Ref : Mil-HDBK-338B

c. **Hazard**

A condition resulting from failures, external events, errors, or combinations thereof where safety is affected.

Ref : SAE ARP 4754A

d. **Main Contractor**

Main Contractor is the development/modification/ production agency who is entrusted with the total responsibility for development/modification /production/ delivery and follow on support of the Air System/ Airborne Store. When multiple agencies are involved, the respective roles and responsibilities may be defined in an agreement/ MoU among the agencies involved. Where there is no ambiguity or when used in a generic sense, the term Main Contractor is used throughout this document.

Ref : IMTAR – 21

e. **Local Modification Committee (LMC)**

LMC is a forum for technical discussions and associated aspects applicability of modifications. It is constituted by the Government.

Ref : IMTAR – 21

f. **Authority Holding Sealed Particulars (AHSP)**

AHSP is the authority responsible for collecting, collating, developing, updating, holding and supplying sealed particulars of the defence items in accordance with the laid down procedure. AHSP for aviation stores is being held by various DPSUs, Ordnance Factories, DGAQA, DRDO labs, individual Services for different aviation stores.

Ref : IMTAR – 21

g. **Life Cycle Environmental Profile (LCEP)**

The baseline document outlining real-world, platform-specific, environmental conditions that a specific item will experience during service-related events (e.g., transportation, storage, operational deployment/use) from its release from manufacturing to the end of its useful life.

Ref : Mil-Std-810G

Life Cycle Profile

A time history of events and conditions associated with materiel from its release from manufacturing to its removal from service, including

demilitarization. The life cycle should include the various phases materiel will encounter in its life, such as: packaging, handling, shipping, and storage prior to use; mission profiles while in use; phases between missions such as stand-by or storage, transfer to and from repair sites and alternate locations; and geographical locations of expected deployment.

Ref : Mil-Std-810G

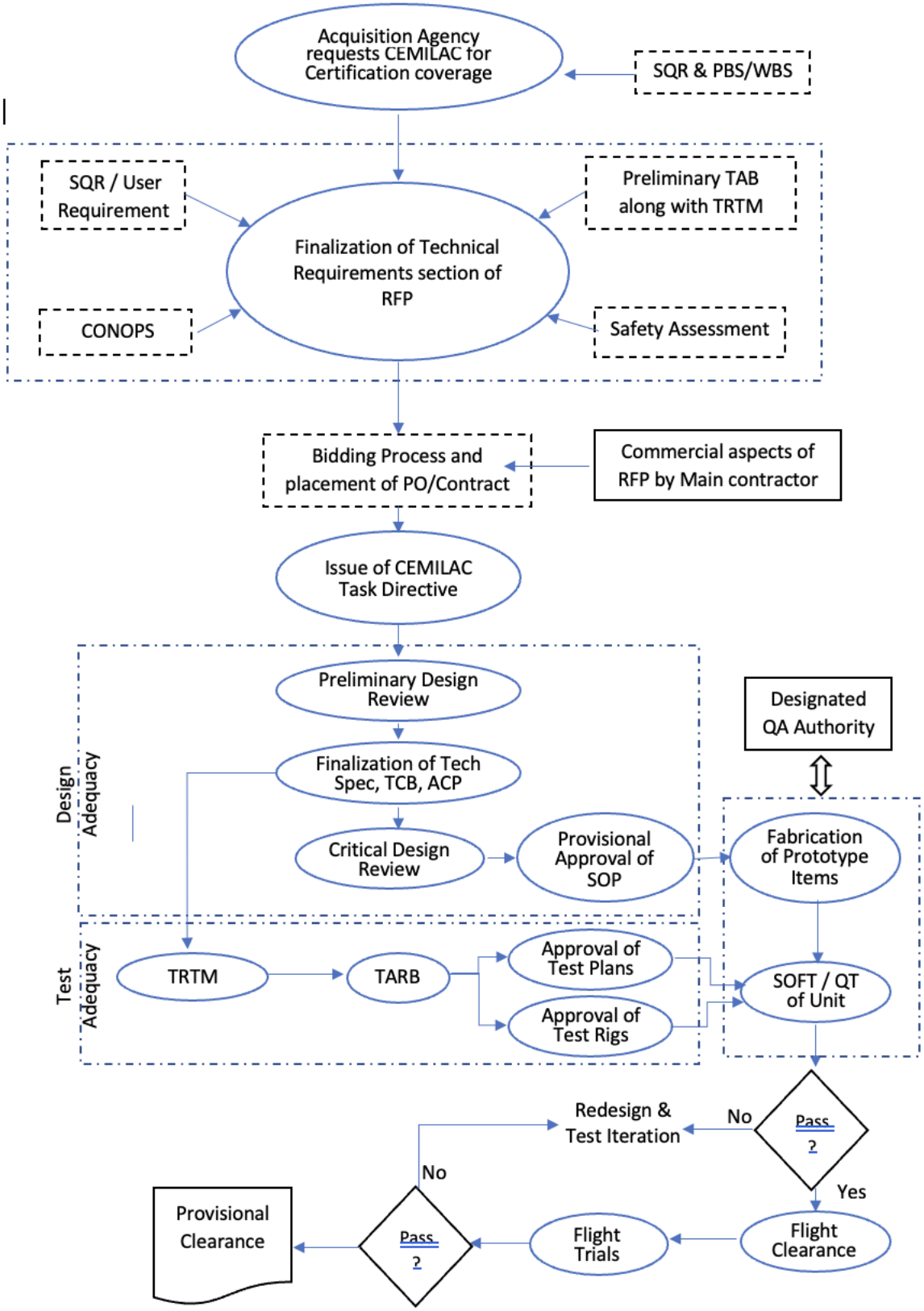
1.7 Abbreviations

1.	ACBS	:	Approved Component Build Standard
2.	ACC	:	Airworthiness Certification Criteria
3.	ACP	:	Airworthiness Certification Plan
4.	ACR	:	Airworthiness Certification Requirements
5.	AFM	:	Airplane Flight Manual
6.	AFQMS	:	Approved Firm Quality Management System
7.	AHSP	:	Approved Holders of Sealed Particulars
8.	AMC	:	Acceptable Means of Compliance
9.	AMM	:	Aircraft Maintenance Manual
10.	ARP	:	Aerospace Recommended Practices
11.	ATE	:	Automatic Test Equipment
12.	ATP	:	Acceptance Test Procedure
13.	BoM	:	Bill of Material
14.	CCCB	:	Central Configuration Control Board
15.	CCOM	:	Cabin Crew Operating Manual
16.	CDR	:	Critical Design Review
17.	CEH	:	Complex Electronics Hardware
18.	CEMILAC	:	Centre for Military Airworthiness and Certification
19.	CFD	:	Computational Fluid Dynamics
20.	CML	:	Consumable Materials List
21.	CoC	:	Certificate of Conformance
22.	CONOPS	:	Concept of Operations
23.	COTS	:	Commercially Off the Shelf
24.	CTAH	:	Combined Temperature, Altitude and Humidity
25.	D&D	:	Design & Development
26.	DCPP	:	Design Cum Production Partner
27.	DDP	:	Declaration of Design and Performance
28.	DDPMAS	:	Design, Development and Production of Military Air Systems and Airborne Stores
29.	DDR	:	Detailed Design Review
30.	DGAQA	:	Directorate General of Aeronautical Quality Assurance
31.	DI	:	Defect Investigation
32.	DO	:	Design Organization
33.	DOAS	:	Design Organization Approval Scheme
34.	DOE	:	Design Organization Exposition
35.	DPFM	:	DRDO Project Formulation and Monitoring
36.	DRDO	:	Defence Research & Development Organization
37.	EASA	:	European Union Aviation Safety Agency

38.	EM	:	Electro Magnetic
39.	EMC	:	Electro Magnetic Conditions
40.	EMI	:	Electro Magnetic Interference
41.	ESS	:	Environmental Stress Screening
42.	FAI	:	First Article Inspection
43.	FCOM	:	Flight Crew Operating Manual
44.	FCTM	:	Flight Crew Training Manual
45.	FMECA	:	Failure Mode Effect and Criticality Analysis
46.	FPGA	:	Field Programmable Gate Array
47.	FRACAS	:	Failure Reporting Analysis & Corrective Action System
48.	FTA	:	Fault Tree Analysis
49.	FTB	:	Flying Test Beds
50.	GM	:	Guidance Material
51.	GOS	:	Ground Operational Systems
52.	GQA	:	Government Quality Assurance
53.	HAS	:	Hardware Accomplishment Summary
54.	HASS	:	Highly Accelerated Stress Screening
55.	IC	:	Integrated Circuits
56.	ICAO	:	International Civil Aviation Organisation
57.	IMTAR	:	Indian Military Technical Airworthiness Requirements
58.	IP	:	Intellectual Property
59.	IV&V	:	Independent Verification & Validation
60.	JAC	:	Joint Airworthiness Committee
61.	JSG	:	Joint Services Guidelines
62.	LAToT	:	License Agreement Transfer of Technology
63.	LCCB	:	Local Configuration Control Board
64.	LMC	:	Local Modification Committee
65.	LRU	:	Line Replaceable Unit
66.	LSP	:	Limited Series Production
67.	LTCC	:	Local Type Certification Committee
68.	MDDO	:	Multi-Disciplinary Design Optimization
69.	MDI	:	Master Drawing Index
70.	Mil	:	Military
71.	MOPS	:	Minimum Operational Performance Standard
72.	MoU	:	Memorandum Of Understanding
73.	MRLS	:	Manufacturer’s Recommended List of Spares
74.	MTBF	:	Mean Time Between Failure
75.	MTTR	:	Mean Time to Repair
76.	NDT	:	Non-Destructive Test

77.	OCM	:	Original Component Manufacturer
78.	OEM	:	Original Equipment Manufacturer
79.	PBS	:	Product Breakdown Structure
80.	PDM	:	Project Data Management
81.	PDR	:	Preliminary Design Review
82.	PLM	:	Project Lifecycle Management
83.	PLOA	:	Probability of Loss of Aircraft
84.	PLOC	:	Probability of Loss of Control
85.	QA	:	Quality Assurance
86.	QAP	:	Quality Assurance Plan
87.	QMS	:	Quality Management System
88.	QRH	:	Quick Reference Handbook
89.	QT	:	Qualification Testing
90.	RBD	:	Reliability Block Diagram
91.	RFP	:	Request for Proposal
92.	RSC	:	Reusable Software Component
93.	SAE	:	Society of Automotive Engineers
94.	SAS	:	Software Accomplishment Summary
95.	SCRB	:	System Certification Review Board
96.	SCT	:	Supply Chain Traceability
97.	SEB	:	System Engineering Board
98.	SP	:	Series Production
99.	SQA	:	Software Quality Assurance
100.	SQR	:	Staff Qualitative Requirement
101.	SRU	:	Shop Replaceable Unit
102.	TAA	:	Technical Airworthiness Authorities
103.	TAB	:	Type Approval Basis
104.	TARB	:	Test Adequacy Review Board
105.	TCB	:	Type Certification Basis
106.	TRR	:	Test Readiness Reviews
107.	UAS	:	Unmanned Aircraft Systems
108.	V&V	:	Verification & Validation
109.	W&BM	:	Weight & Balance Manual
110.	WBS	:	Work Breakdown Structure

Flow chart for inclusion of RFP aspects in Airworthiness Certification



2 Airworthiness Certification Requirements

2.1 List of requirements

Requirement ID	Title
ACR-RFP-A01	Quality Management System
ACR-RFP-A02	System Engineering approach to product development
ACR-RFP-A03	Safety Assessment Process
ACR-RFP-A04	Inclusion of detailed Requirement Specification
ACR-RFP-A05	Design Adequacy
ACR-RFP-A06	Fabrication of the Product
ACR-RFP-A07	Software/CEH Development and IV&V
ACR-RFP-A08	Test Adequacy
ACR-RFP-A09	Series Production
ACR-RFP-A10	Continued Airworthiness
ACR-RFP-A11	Documentation
ACR-RFP-A12	Authorised Holder of Sealed Particulars (AHSP)
ACR-RFP-A13	Maintenance, Servicing and Repair
ACR-RFP-A14	Tools, Testers and Ground Equipment
ACR-RFP-A15	Publications
ACR-RFP-A16	Certification Authority and Certification Basis
ACR-RFP-A17	Pre – RFP Certification Activities
ACR-RFP-A18	Data Access to CEMILAC
ACR-RFP-A19	Review and Audit by CEMILAC
ACR-RFP-A20	Inclusion of Government QA Agency

2.2 Detailed Airworthiness Requirements

01	**Requirement ID:** ACR-RFP-A01	**Title:** Quality Management System
	Requirement: The Main Contractor shall ensure in the RFP that the supplier shall have a Quality Management System (QMS).	
	Acceptable Means of Compliance: (i) The Main Contractor shall have a Supplier Selection System that ensures the supplier has matured quality management process required by aeronautical product development, either by carrying out a Supplier Audit or using industry standards.	
	Guidance Material (i) The industry standards QMS are AFQMS issued by DGAQA, AS9100 by ASQ.	

02	**Requirement ID:** ACR-RFP-A02	**Title:** System Engineering approach to product development
	Requirement: The Main Contractor shall ensure in the RFP, that the supplier follows system engineering process throughout the product lifecycle.	
	Acceptable Means of Compliance: (i) The RFP shall emphasis that the supplier needs to follow System Engineering approach inter-alia development of ConOps, Requirement analysis, design analysis, modelling & simulation, configuration management, risk management, independent reviews, quality assurance. (ii) The RFP shall clearly state that all the items (viz hardware, software, test jigs) shall be properly identified by unique part number. (iii) The supplier shall also be expected to constituted failure analysis boards, test readiness review boards, results analysis teams, safety review boards, flight readiness review boards. The review process shall have adequate independence. If the coverage from	

	TAA is planned, then the RFP shall have provisions that CEMILAC and DGAQA/User QA along with main contractors are members of these boards.	
	Guidance Material (i) The following standards may be included in the RFP for System Engineering processes to be followed: • ISO/IEC/IEEE 15288 - Systems and Software engineering. • ARP-4754A - Guidelines for Development of Civil Aircraft and Systems.	

03	**Requirement ID:** ACR-RFP-A03	**Title:** Safety Assessment Process
	Requirement: The Main Contractor shall mention in the RFP, the criticality of the system based on Safety Assessment.	
	Acceptable Means of Compliance: (i) The main contractor shall carry out preliminary Safety Assessment and include the criticality of the system. (ii) The criticality of the systems shall be evolved both from flight functional hazards and Mission hazards that can impact survivability. (iii) The RFP shall state that the Supplier shall carry out detailed System Safety Assessment like FMEA, FMECA, Common Cause, Zonal Analysis, reliability analysis.	
	Guidance Material (i) The following standards can be included in the RFP for Safety Assessment processes to be followed: • SAE ARP 4761 - Guidelines for Conducting the Safety Assessment Process on Civil Aircraft, Systems, and Equipment. • Mil-Std-882 - Standard Practice for System Safety. • Mil-Std-1629 - Procedures for Performing a Failure Mode, Effects, and Criticality Analysis	

04	**Requirement ID:** ACR-RFP-A04	**Title:** Inclusion of detailed Requirement Specification
	Requirement: The Main Contractor shall bring out detailed requirement specification of the product in the RFP.	
	Acceptable Means of Compliance: (i) The requirement specification shall include, but not restricted to, functional, performance, safety, reliability & maintainability, interface, physical aspects, endurance, lifing, environmental/EMI, aspects, self-test. (i) Before finalizing the requirements specifications, the main contractor shall carry out a detailed requirements analysis which shall be reviewed by subject matter experts to ensure all the requirements are correct, complete, consistent and verifiable. (ii) The Means of Compliance shall also be included as a part of requirements specification.	
	Guidance Material (i) The specification may include performance standards like RTCA MOPS, SAE documents, IEC, Mil Standards, ASTM and interface standards like ARINC. (ii) A generic list of specification parameters for LRUs are listed in Appendix-A.	

05	**Requirement ID:** ACR-RFP-A05	**Title:** Design Adequacy
	Requirement: The main contractor shall include necessary provisions in the RFP to ensure that all the processes, activities and artifacts to ensure design adequacy are generated by the Supplier.	
	Acceptable Means of Compliance: (i) The RFP shall include the scope and schedule of PDRs, CDRs and other reviews.	

	(ii) The RFP shall include the applicable modelling, simulation, analysis to ensure that the design would meet the both the requirement specifications and certification requirements. (iii) The RFP shall clearly state the criteria for use COTS items (hardware/software/IP Cores) in the design.
	Guidance Material (i) The RFP may include the applicable reviews given in Mil-Std-1521B, *Technical Reviews and Audits for Systems, Equipment and Computer Software*. (ii) List of Criteria to be considered during PDR and CDR of a typical Airborne system is listed in Appendix - B. (iii) A generic list of analysis for avionics and mechanical systems are in Appendix - C1 and Appendix - C2 respectively.

06	**Requirement ID:** ACR-RFP-A06	**Title:** Fabrication of the Product
	Requirement: The main contractor shall ensure in the RFP the necessary guidelines for procurement, fabrication, assembly and inspection processes.	
	Acceptable Means of Compliance: (i) The RFP shall include the requirements to ensure control on the source of supply, traceability to OEMs, proper storage and handling of components/materials. (ii) The RFP shall include the need for tooling, jigs etc. needed for manufacturing and assemblies. (iii) The RFP shall include provisions for Kit-of-parts inspection, process audit, stage inspection by the GQA and main contractor QA. (iv) The RFP shall include provisions for trained and approved/certified personal carrying out fabrication, inspection and testing. (v) The RFP shall include the need of first article inspection (FAI).	

	(vi) The RFP shall state that all the artefacts and data generated (like CoCs, Route cards, inspection and test reports) need to be preserved.	
	Guidance Material (i) The fabrication process and the QA aspects may be documented in QAP and agreed by GQA.	

07	**Requirement ID:** ACR-RFP-A07	**Title:** Software/CEH Development and IV&V
	Requirement: The main contractor shall include necessary provisions in the RFP to ensure the supplier follows systematic Software/CEH development and integral processes.	
	Acceptable Means of Compliance: (i) The RFP shall include the Software/CEH development lifecycle standards. (ii) The RFP shall include the necessary Software/CEH documentation requirements. (iii) The RFP shall include the extent of Independent Verification & Validation (IV&V) and Software Quality Assurance (SQA) processes to be followed by the supplier for software certification.	
	Guidance Material (i) The RFP may include the requirements given in Subpart C6 of IMTAR-21. (ii) The CEH certification may follow the CEMILAC Airworthiness Directive 16/2016 titled "*Complex Electronics Hardware – Development & Certification*" (iii) The list of Software/CEH documents are included in Appendix – E3.	

08	**Requirement ID:** ACR-RFP-A08	**Title:** Test Adequacy
	Requirement:	

	The main contractor shall include necessary provisions in the RFP to ensure the supplier carries out applicable test and evaluation.
	Acceptable Means of Compliance: (i) The RFP shall include as applicable the type of tests, including but not limited to, functional, environmental, integration, aircraft ground integration and flight trials. (ii) The RFP shall state the life-cycle profile so that the Lifecycle Environmental Profiles [LCEP] can be evolved by the supplier and the qualification tests (both environmental and EM) can be tailored. (iii) The RFP shall include the requirements for test facilities like test jigs, rigs, ATEs. The RFP shall bring out that such facilities shall be approved by TAA based on the type and nature of the test facility. (iv) The RFP shall state that the supplier shall plan to fabricate sufficient samples to ensure the adequate testing. Test samples shall be quarantined and preserved for future reference. (v) The RFP shall include that the tests shall be carried out in NABL accredited test laboratories and all the test equipment have valid calibration certificates. (vi) The RFP shall include the clause that the identified Main Contractor QA, GQA, CEMILAC can witness the tests whenever and wherever conducted. (vii) The RFP shall include the clause that the Main Contractor QA, GQA and CEMILAC has access to all the test plans and test reports. (viii) The RFP shall include the clause that the Main Contractor, GQA and CEMILAC can participate in Defect Investigation (DI) process during failure analysis. (ix) The RFP shall clearly state that necessary testing may have to repeated in the presence of GQA, if the GQA is not satisfied with the results submitted by the supplier.

	(x) If flight testing is planned, the RFP shall clearly state the flight-testing agency who would be involved in ground and flight evaluation of the system. (xi) The RFP shall include the need to conduct Test Readiness Reviews (TRRs) and Test Result Reviews.
	Guidance Material (i) Airworthiness Directive 14 / 2015, Safety of Flight Tests gives guidelines on safety of flight tests that need to be conducted prior to developmental flight trials of non-safety critical systems. (ii) The RFP may include provision that any additional testing requirements that emerge based on PDR/CDR/TARB needs to be carried out even though they were not included in the original requirements/RFP. (iii) A generic list of environmental tests is listed Appendix – D for reference.

09	**Requirement ID:** ACR-RFP-A09	**Title:** Series Production
	Requirement: The Main Contractor shall mention in the RFP, that the requirements pertaining to airworthiness certification and quality assurance during LSP and SP (as applicable).	
	Acceptable Means of Compliance: (i) The main contractor to clearly state that GQA would be involved during the production (Both LSP and SP). (ii) The main contractor to ensure in the RFP that the production shall be as per the approved build standard only. (iii) The RFP shall state that production deviations are handled through a proper non-conformance review process with the participation of the appropriate stakeholders.	
	Guidance Material (i) The production process and the QA aspects may be documented as per GQA approved QAP.	

10	**Requirement ID:** ACR-RFP-A10	**Title:** Continued Airworthiness
	Requirement: The Main Contractor shall mention in the RFP, that the supplier has to meet the continued airworthiness requirements during in-service phase (operational lifecycle).	
	Acceptable Means of Compliance: (i) The main contractor to ensure that supplier establishes a FRACAS system for failure analysis. (ii) The main contractor to ensure that the supplier has a robust configuration management system to track the changes to the product configuration throughout the lifecycle. (iii) The RFP shall include the provisions for handling obsolescence management.	
	Guidance Material (i) The main contract may adopt the Local Modification Committee (LMC) approach for modification. (ii) All the defects and failures are to be collected, analysis and root cause established.	

11	**Requirement ID:** ACR-RFP-A11	**Title:** Documentation
	Requirement: The Main Contractor shall mention in the RFP, the list of documents/document types that need to be generated throughout the lifecycle of the product, during D&D, Production and in-service phases.	
	Acceptable Means of Compliance: (i) The documents include, but not limited to, requirement documents, design documents, analysis, review reports, inspection records, QA audits records, test reports, sub-supplier data/documents. (ii) All the documents and data shall be properly managed through proper change/configuration management procedures. (iii) The RFP shall state the period for which the documents need to be archived.	

	Guidance Material (i) A list of documents for Avionics and Aero-Mechanical/armament is attached as Appendix – E1 and Appendix – E2 respectively

12	**Requirement ID:** ACR-RFP-A12	**Title:** Authorised Holder of Sealed Particulars
	Requirement: The Main Contractor shall mention in the RFP, the nominated Approved Holders of Sealed Particulars (AHSP).	
	Acceptable Means of Compliance: (i) AHSP are the authorized holders of design, fabrication and test data at the end of the D&D process. Hence, the RFP shall clearly state the AHSP. (ii) The list of documents that shall part of 'Sealed Particulars' shall also be mentioned in the RFP.	
	Guidance Material (i) AHSP may be as defined in Para 1.4.2 of DPM-2009	

13	**Requirement ID:** ACR-RFP-A13	**Title:** Maintenance & Servicing
	Requirement: The Main Contractor shall mention in the RFP, the maintenance & servicing requirements.	
	Acceptable Means of Compliance: (i) The RFP shall include the need for development of servicing & maintenance schedules. (ii) The RFP shall state the competent authority for acceptance of the Maintenance & Servicing schedules and carrying out Maintenance Evaluation trials (MET). (iii) The RFP shall indicate the need the supplier develops the necessary repair schemes (both in field and lab) and repair facilities. (iv) The RFP shall state the details MRLS requirements and need of supply of Time Limited Items.	

	Guidance Material (i) Acceptance of TTGEs may be as per IMTAR 21 Subpart T2.

14	**Requirement ID:** ACR-RFP-A14	**Title:** Tools, Testers and Ground Equipment
	Requirement: The Main Contractor shall mention in the RFP, the list of tools, testers and ground equipment required for maintenance of the Product.	
	Acceptable Means of Compliance: (i) The RFP shall state the O-Level, I-Level and D-Level tools and testers. (ii) The Tools, testers and ground equipment shall be approved by the competent QA agency. The RFP shall include the QA agency responsible for acceptance of TTGEs.	
	Guidance Material (i) Acceptance of TTGEs may be as per IMTAR 21 Subpart T2.	

15	**Requirement ID:** ACR-RFP-A15	**Title:** Publications
	Requirement: The Main Contractor shall mention in the RFP, the requirements towards publications pertaining to operational and maintenance aspects and the associated certification requirements.	
	Acceptable Means of Compliance: (i) The RFP shall state the data/documents that the supplier shall provide towards preparation of manuals inter alia AFM, FCOM, CCOM, QRH, FCTM, W&BM. (ii) The RFP shall state the data/documents that the supplier shall provide towards preparation AMM. (iii) The RFP shall state that the supplier shall generate the technical manuals, including but not limited to, Component Maintenance Manual (CMM), Trouble Shooting Manual (TSM), Illustrated Parts Catalogue (IPC), Consumable Materials List (CML).	
	Guidance Material	

	Nil

16	**Requirement ID:** ACR-RFP-A16	**Title:** Certification Authority and Certification Basis
	Requirement: The Main Contractor shall mention in the RFP that CEMILAC is the National Military Airworthiness Certification Authority in India and DDPMAS is the basis document for certification.	
	Acceptable Means of Compliance: (i) Military Airworthiness Certification in India is governed by DDPMAS, IMTAR-21 along with various Level-3 Manuals. Hence, the RFP shall clearly state that certification shall be carried out as per the provisions in these documents. (ii) CEMILAC and its Regional Centres for Military Airworthiness (RCMAs) are the Military Airworthiness Certification Authorities in India.	
	Guidance Material (i) DDPMAS and IMTAR-21 undergo revisions and amendments. Hence, the latest version of these documents should be referred in the RFP. (ii) If previous versions of these document are to used, then consent from CEMILAC shall be obtained on case-to-case basis.	

17	**Requirement ID:** ACR-RFP-A17	**Title:** Pre-RFP Certification Activities
	Requirement: The Main Contractor may interact with CEMILAC for understanding the certification requirements before floating of the RFP.	
	Acceptable Means of Compliance: (i) In case of ab-initio development, the main contractor can approach CEMILAC with the requirement specification or draft SQR document for seeking the necessary certification requirements.	

	(ii) In case of Indigenous substitution, the certification requirements evolved during LTCC may be taken as the basis. (iii) In case of modification/upgrades, the main contractor can approach CEMILAC with the details of modification scheme and seek the necessary certification requirements.
	Guidance Material (i) The main contractor should note that RFP is generated in the preliminary stage of the product development and the extent of details of the product may be limited. Hence, the certification requirements from RCMAs may also be generic and high level only.

18	**Requirement ID:** ACR-RFP-A18	**Title:** Data Access to CEMILAC
	Requirement: The Main Contractor to mention in the RFP that Indian Military Airworthiness Certification authority i.e., CEMILAC has the right to access all the system related artifacts, data and documents.	
	Acceptable Means of Compliance: (i) RFP shall contain a para describing the modalities of sharing the documents and data for certification. (ii) The Main Contractor to mention in the RFP, in case the supplier is outsourcing to sub-suppliers, the applicable airworthiness requirements to be flowed down in the subsequent RFPs issued by the supplier.	
	Guidance Material Nil	

19	**Requirement ID:** ACR-RFP-A19	**Title:** Review and Audit by CEMILAC
	Requirement: The Main Contractor shall mention in the RFP that Indian Military Airworthiness Certification authority i.e. CEMILAC can constitute any airworthiness review and audit teams either independently or in association with the Main contractor towards certification of the product	

	Acceptable Means of Compliance: (i) CEMILAC may recommend constitution of Test Adequacy Review Board (TARB) to ensure that all the testing requirements are captured adequately. (ii) Chief Executive(Airworthiness), CEMILAC may constitute System Certification Review Board (SCRB) to evolve/review certification requirements and tailoring of standards.
	Guidance Material Nil

20	**Requirement ID:** ACR-RFP-A20	**Title:** Inclusion of Government QA Agency
	Requirement: The Main Contractor shall explicitly bring out in the RFP, the Govt. QA agency.	
	Acceptable Means of Compliance: (i) DGAQA is the Govt. QA agency for Military Aeronautical Products. Hence, DGAQA shall be included as the QA agency. (ii) In case User Services opt to nominate their QA organization, then the name of the User Service QA organization shall be included in the RFP. (iii) In either case, the main contractor shall discuss the QA requirements with the identified Govt QA Agency and include them as a part of the RFP.	
	Guidance Material Nil	

3 Review, Promulgation and Feedback

3.1 Review

This document was prepared internally within CEMILAC and reviewed by the Council of Director of CEMILAC.

3.2 Promulgation

This document is a part of manuals layer of Technical Airworthiness Framework. The document would be available in CEMILAC's official website after release.

3.3 Feedback

Any feedback on the document may please be forwarded to:

The Director (Mat & PI)
CEMILAC, Defence R&D Organization,
Ministry of Defense,
Bengaluru, Karnataka, India
PIN Code – 560 037
Email : dte-mat.pi@gov.in

4 References

i. DDPMAS Ver 1.0, *Framework and Procedure for Design, Development and Production of Military Air systems and airborne stores*

ii. IMTAR-21, Version 1.0, *Indian Military Technical Airworthiness Requirements*

iii. DPM-2009, Defence Procurement Manual – 2009 (Revenue Procurement)

iv. Mil-HDBK-338B, *Electronic Reliability Design Handbook*

v. SAE ARP 4754A, *Guidelines for Development of Civil Aircraft and Systems*

vi. SAE AS6081, *Compliance Verification Criterion Standard for Fraudulent/ Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition – Distributors*

vii. AS9100, *Aerospace - Model for Quality Assurance in Design, Development, Production, Installation and Servicing*

viii. ISO/IEC/IEEE 15288, *Systems and software engineering – System life cycle processes*

ix. Mil-Std-882, *Standard Practice: System Safety*

x. SAE ARP 4761, *Guidelines and Methods for Conducting the Safety Assessment Process on Civil Airborne Systems and Equipment*

xi. Mil Std 1521B, *Technical Reviews and Audits for Systems, Equipment and Computer Software*

xii. Airworthiness Directive 14 / 2015, *Safety of Flight Tests*

xiii. Mil-Std-810G : *Environmental Engineering Considerations and Laboratory Tests*

xiv. Mil-Std-461G : *Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment*

xv. Mil-Std-704F : *Aircraft Electric Power Characteristics*

xvi. JSS 55555 : *Environmental Test Methods for Electronic and Electrical Equipment*

xvii. RTCA-DO-160 :*Environmental Conditions and Test Procedures for Airborne Equipment*

Appendix – A1: Sample Requirement Specification

1. Physical and interface specification

1.1 Dimension:

[LRU-PY -01]Outer Dimension (including Connectors, handle & locating pin): (Note : give details with and without mounting tray)

…. (L) x … (W) x … (H) (in mm) Tolerance: ±… mm.

1.2 Weight:

[LRU-PY -02] LRU Weight shall be < …. Kgs or … ±… Kgs

(Note : give details with and without mounting tray)

1.3 Mounting:

[LRU-PY-03] : (Note : give details of mounting mechanism, like tray, interface plates etc.)

1.4 Chassis Cooling:

[LRU-PY -04] The Chassis of LRU shall be conduction/forced/liquid cooled. <Give Cooling specification>

1.5 Chassis Connections:

[LRU-PY -05] LRU chassis power and signal input and output connections shall be made through D38999 series connector. <Any other schemes>

1.6 Accessibility:

[LRU-PY-06] LRU shall be designed to access all the SRUs by opening one of bottom cover. <Any other schemes>

1.7 Mechanical Design & Construction:

[LRU-PY-07] The LRU Chassis shall be designed using milled construction. The material used shall be HE30. For ease carrying, it shall be provided with handle. The Chassis shall have mounting lugs.
Colour: Black Finish: MATT Finish
<Any other schemes>

1.8 Marking:

[LRU-PY-08] The entire connectors shall be engraved onto the unit to ease the identification. The Name plate of LRU shall have Nodal Establishment name, LRU Name, Sl. No. and Hardware versions/Software versions engraved on it. <Any other schemes>

1.9 Interfaces:

<Mil-Std-1553, ARINC, RS422, Discrete, analogs etc.>

2. Electrical Specifications

2.1 Input power supplies:

[LRU-EL -01] : Power Supplies shall be complaint to Mil-Std-704E. <Any other schemes>

2.2 Power consumption:

[LRU-EL -02] : Not exceeding TBD Watts under worst case conditions.

2.3 Grounding requirement:

[LRU-EL -03]:Input Power ground, Signal ground and Chassis ground shall be Isolated. Chassis ground shall be connected to cable shield and filter pin ground <Any other schemes>

2.4 Insulation & Bonding:

[LRU-EL -04]: Insulation resistance measured between connector pins & chassis: >10MΩ

[LRU-EL -05]: Bonding resistance measured between any two contacts in the Chassis < 100mΩ <Any other schemes>

3. Reliability and Maintainability Requirements

[LRU-R&M-01]: Total Calendar Life: <TBD> Years

[LRU-R&M-02]: Total Operating Hours: <TBD> Hours

[LRU-R&M-03]: Mean Time Between Failures (MTBF): <TBD> Hours

[LRU-R&M-04]: Time Between Overhaul (TBO): <TBD> Year

[LRU-R&M-05]: Mean Time To Repair (MTTR): <TBD> Hour

(SRU level Replacement)

4. Safety and Redundancy Requirement

[LRU-SAF-01]: Criticality Classification

5. Functional & Performance Requirement of LRU system

<All the functional requirements properly tagged. >

<All the Performance requirements properly tagged. >

<If the functionality has to meet any ICAO/Mil/RTCA standards ensure that all the applicable functional/performance requirements are included >

6. Environmental Test Requirements

The LRU shall be subjected to all the below QT Tests.
MIL STD 810G may be followed for environmental testing
A Sample is given below

Sl. No.	Requirement ID	Test Name	Test Specification
1	[LRU-QT 001]	Vibration Test	0.04 g^2/Hz, frequency 20-2000 Hz, 1 Hr per axis in all three axis
2	[LRU-QT- 002]	High Temperature Storage cum Operational Test	Operation Temperature : +65°C Storage Temperature : +85°C
3		**……**	

7.0 EMI/EMC Test Requirements

MIL STD 461E may be followed.
Category: External / Internal Mounted (with Respect to Electro Magnetic Conditions and not as per climatic)
Classification: Critical/Non-Critical
Sample is given below

Sl. No.	Requirement ID	Test Name	Test Specification
1	[LRU-QT-050]	CE101	Curve #2 Figure CE101-4
2	[LRU-QT-051]	CE102	Basic Curve CE102-1
3	….	….	

The generic list of tests is given in Appendix – D.

Appendix – B: Criteria for PDR and CDR of Airborne Projects

(i) Criteria for PDR

Sl. No.	Criteria	Complied/ Not Complied/ Not Applicable	Proof of Compliance (if the criterion is applicable)	Remarks
A. Project Management Aspects				
1	System Engineering Plan document is generated. System Engineering Board (SEB) constitution is decided.			
2	Project management plans like System Development Plan, System Configuration Management Plan are available.			
3	Project Lifecycle Management (PLM) Plan and Project Data Management (PDM) Plans are available.			
4	Outsourcing plan and selection criteria for DCPP are identified.			
B. Requirements Aspects				
1	CONOPS has been prepared and consulted with User Services. The CONOPS shall cover all the aspects like Operational, Maintenance, training etc.			
2	Requirements analysis carried out based on CONOPS and System Requirement Document finalized.			
3	The external interface requirements are clearly identified.			
C. Design Aspects				
1	One or more feasible preliminary designs have been identified.			
2	Analysis of candidate designs have been carried out and the reports are available.			
3	Quantitative Multi-Disciplinary Design Optimization (MDDO) has been performed.			
4	The system architecture is finalized. The PBS and WBS are generated.			

D. Safety and Survivability Aspects				
1	Safety and Reliability Management Plan with detailed objectives, tools are identified.			
2	Functional Hazard analysis and Preliminary System Safety Analysis, Functional FMECA are performed.			
3	Mission Hazard Analysis is performed.			
4	The criticality levels (Design Assurance Levels) are assigned to each subsystem.			
5	Probability of Loss of Control (PLOC) and Probability of Loss of Aircraft (PLOA) are identified.			
6	Human Factors that impact Safety and Performance are identified.			
E. Verification and Validation				
1	A detailed system level verification and validation plan is generated.			
2	A test requirement traceability matrix covering a detailed means of testing is generated.			
3	Life Cycle Environmental Profile of the project is understood and the environmental requirements (climatic, Mechanical, Electro Magnetic) are identified as a part of Master Environmental Test & Evaluation Plan			
4	All test rigs and test facilities for design validation (component, subsystem and system level) are identified. The acceptance methodology for these facilities is broadly outlined.			
5	Flight Test requirements are identified.			
6	All tools required for testing are identified.			
7	Test Adequacy Review Boards are identified.			
F. Reliability and Maintainability Aspects				
1	Reliability analysis is carried out and the reliability figures are assigned.			

2	Redundant Management is identified.			
3	Maintenance Philosophy is understood and documented.			
4	O-Level, I-Level and D-Level testing requirements are captured.			
G. Quality Assurance Aspects				
1	Quality Assurance Objectives for the project are identified.			
2	Quality Assurance Plan document is generated.			
3	QA Teams are identified and training requirements are planned.			
4	Component, Subsystem and System level inspection and screening are clearly identified.			
5	The QMS requirements for the outsourcing agencies are identified.			
H. Manufacturing and Production ToT Planning				
1	The technologies for manufacturing for components and subsystems are understood.			
2	Series Production Facilities (ATE, production rigs) are planned.			
3	The proposed architecture is reviewed for Manufacturing and assembly.			
4	The training needs for the Manufacturing / Production / ToT Partner is identified.			
I. Risk Management				
1	Technical Risks (Development & Testing/Valuation), Procurement Risks are identified and quantified.			
2	Risk Mitigation Plans (Plan – B) are analyzed and suitable options are identified.			
J. Certification				
1	Preliminary discussion with Certification Agencies (CEMILAC, DGAQA) conducted and Certification Criteria are identified.			
2	Airworthiness Certification Plan & Quality Assurance Plan (QAP) have been prepared and reviewed by the certification agencies.			

(i) Criteria for DDR (for subsystem) / CDR (System Level)

Sl. No.	Criteria	Complied/ Not Complied/ Not Applicable	Proof of Compliance (if the criterion is applicable)	Remarks
A. Project Management Aspects				
1	All the applicable sections of DPFM are met (applicable for DRDO Projects). Other D&D organization may follow the provisions given in Mil Std 1521.			
2	PDR suggestions have been incorporated.			
3	All the Subsystem design review committee (DDR) have been incorporated.			
4	The constitution of DDR/CDR is in accordance with Section 2.5.2 of DPFM-2021. (Applicable for DRDO Projects).			
5	All changes carried out in the conceptual design between PDR to DDR/CDR has reviewed and approved by Local Configuration Control Board (LCCB)/Central Configuration Board (CCCB)/System Engineering Board (SEB).			
6	All the data generated at various work centres that forms the basis of CDR are uploaded in the PLM Server.			
B. Requirements Aspects				
1	The System Architecture has been finalized and System Requirement allocation has been carried out to subsystems and modules.			
2	Subsystem Technical Specification requirements (from system requirements and derived requirements) have been generated and reviewed. The specifications cover not only functional, and performance, but also environmental, life related, reliability & maintainability, testability.			

2	All inter Subsystems/LRUs/SRUs interfaces are identified.			
3	It is ensured that all technical specification parameters are ensured to be ‘quantifiable’, ‘Correct’, ‘Complete’, ‘Consistent’ and ‘Verifiable’.			
4	The documentation and publications requirements are identified. The documentation includes the design documents (hardware & software), production documents, testing documents. The publication includes user manuals, maintenance manuals, fault diagnosis and repair etc.			
C. Design & Development Aspects				
1	Component level design are finalized and the drawings are baselined.			
2.	Standard and special processes involved in the development of the products are identified.			
3	Engineering models / prototypes are realized as per the component / system build standards and assembled.			
4	Applicable analysis for Structural systems, mechanical systems, Electronics and software/FPGA are carried out.			
5	The analysis results are reviewed and found to meet requirements. All the analysis which are not meeting the requirements are listed and mitigation are planned. The negative connotations of the limitations brought out by the analysis are studied for their impact on the user requirements.			
D. Safety and Survivability Aspects				
1	Detailed System Safety Analysis including Fault Tree Analysis, Dependence Diagrams, Particular Risk Analysis, Zonal Analysis, Common Cause Analysis, Markov analysis are carried out.			
2	Sub-system / software criticality levels are finalized.			

3	Derived requirements (Hardware, software and CEH) are analyzed for their impact on safety.			
4	Impact of software failures on the overall safety is analyzed.			
5	The design features for detection and annunciation of various failures are studied.			
E. Verification and Validation				
1	Component Level, Sub-system Level test plans for safety Functionality and performance are carried out.			
2	Functional Testing on Prototype/Engineering Models are carried out and results are reviewed.			
3	The test systems have been developed and accepted by Test System Adequacy Review Boards.			
4	Environmental, power compatibility and EMI/EMC tests are performed to the extent possible/planned on the prototypes.			
5	Component level fatigue tests are performed.			
6	Component level lifing tests are performed.			
7	The test results are reviewed and found to meet requirements. All the test results which are not meeting the requirements are listed and mitigation are planned. The negative connotations of the limitations brought out by the testing are studied for their impact on the user requirements.			
8	The human aspects of system are evaluated with User representatives.			
9	Component level/Sub-system level have been flight tested in Flying Test Beds (FTB).			
F. Reliability and Maintainability Aspects				
1	Reliability Block Diagram (RBD) is generated.			
2	Component Level FMECA is carried out.			

3	Detailed Reliability analysis (Parts Stress Method) is carried out. Derating Analysis are carried out.			
4	Availability and Dependability estimates are developed.			
5	MTBF/MTTR are estimated.			
6	Failure Reporting Analysis and Corrective Action System (FRACAS) is established and all the failures, corrective action and preventive actions are tracked.			
7	If software is present, the software reliability is established.			
G. Quality Assurance Aspects				
1	All the physical attributes (e.g., dimensions, finish etc.) and processes (e.g., welding, soldering, assembly etc.) have been found to meet the specifications.			
2	Non-compliances have been recorded and subject to non-compliance review processes. Corrective and Preventive actions have been recorded.			
3	Failure Analysis Review Boards have been constituted and all the defect investigations have been carried out meticulously.			
4	Oversight audits have been carried out on suppliers as planned in the QAP and the supplier quality meet the overall quality objectives.			
5	Inward goods inspection processes have been established and component / material traceability aspects are available.			
6	All quality related matrices are identified.			
H. Manufacturing and Production ToT Planning				
1	All manufacturing jigs are fabricated and used in the realization of prototypes. Limitations, if any in the manufacturing jigs are documented and improvement plans are established.			
2	The design has been assessed for Design for Manufacturing, Design for Assembly and Design for Testability			

3	Automatic Test Equipment (ATE) specifications are finalized.			
4	Draft Production ATPs are generated and discussed with LAToT partners.			
I. Risk Management				
1	The risk identified during initial phases of the projects (like peer review, PDR, DDR) are tracked and eliminated.			
2	New Risks from implementation, Limited Series Production, (LSP) and Series production are identified and mitigation planned.			
J. Certification				
1	Type Approval Basis / Type certification Basis is finalized and approved by CEMILAC.			
2	Compliance Standards are tailored in accordance with the project requirements and concurred by CEMILAC.			

Appendix – C1: Generic List of Analysis for Avionics

1. Thermal Analysis
2. Signal Integrity Analysis
3. Power Integrity analysis
4. AC/DC load analysis
5. Sensitivity analysis
6. Structural load analysis
7. Electrical load analysis
8. Data Bus loading analysis
9. Worst Case Timing Analysis
10. Functional Hazard Analysis
11. De-rating analysis
12. Reliability Prediction
13. Zonal Safety analysis
14. Particular Risk Analysis
15. Common Cause Analysis
16. FMEA/FMECA
17. Preventive Maintenance Analysis
18. Corrective Maintenance analysis
19. Pressure and flow analysis
20. Electromagnetic Environmental Effects Integration Analysis
21. Magnetic flux analysis

Note: Analysis reports listed above may vary from store to Store. Depending of the nature of the product, applicable analysis may be included in the RFP.

Appendix – C2 : Generic List of Analysis for Aero-Mechanical Equipment/Systems

1. Static Stress Analysis
2. Dynamic Analysis (Shock, Vibration etc)
3. Kinematic Analysis
4. CFD Analysis
5. Clash/Gap Analysis
6. Performance Analysis
7. Store Separation Analysis
8. Thermal Analysis
9. Reliability analysis
10. Structural load analysis
11. Zonal Safety analysis
12. Particular Risk Analysis
13. Common Cause Analysis
14. Functional Hazard Analysis
15. Fault Tree Analysis
16. FMEA/FMECA
17. Fatigue Analysis
18. Flutter Analysis
19. Pressure and flow analysis
20. CLAW Analysis (Open & Closed Loop)
21. Finite Element Analysis
22. Sensitivity analysis
23. Performance Analysis
24. Motion in Rail Analysis
25. Store Separation analysis
26. Engine Plume Compatibility analysis etc.,

Note: Analysis reports listed above may vary from store to Store. Depending of the nature of the product, applicable analysis may be included in the RFP.

Appendix – D: List of Qualification Tests

In general, qualification test requirement for the airborne stores is categorised as environmental qualification test and functional qualification test. Based on Lifecycle Environmental Profile (LCEP), the environmental test can be finalized for climatic, induced,

A. Environmental Tests include the following

1. High Temperature
2. Low Temperature
3. Rapid/Explosive Decompression Test
4. Altitude (Low Pressure)
5. Thermal Shock
6. Humidity
7. Combined Temperature, Altitude and Humidity (CTAH)
8. Rain
9. Sand & Dust
10. Salt fog
11. Icing & Hail Storm
12. Solar radiation
13. Fungus
14. Vibration
15. Gun Fire Vibration
16. Acceleration (Functional, Structural and Crash)
17. Mechanical Shock (functional, crash, transit drop, bench handling)
18. Explosive atmosphere
19. Contamination resistance
20. EMI/EMC (Conducted/Radiated Susceptibility/Emission)
21. Power Supply Compatibility
22. Indirect Effects of Lightning
23. Electro Static Discharge

B. Additional Design Validation Testing

1. Compass Swing Test
2. Highly Accelerated Life Testing (HALT)
3. Sunlight Readability Test
4. NVG Compatibility Test
5. Aerodynamic Load Test

C. Lifing test shall include the following

1. Endurance test

D. Screening Tests

1. COTS screening
2. Environmental Stress Screening (ESS)
3. Highly Accelerated Stress Screening (HASS)

Typical Standards followed for Environmental Tests

a)	Mil-Std-810 :	Environmental Engineering Considerations and Laboratory Tests
b)	Mil-Std-461 :	Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment
c)	Mil-Std-704 :	Aircraft Electric Power Characteristics
d)	JSS 55555 :	Environmental Test Methods for Electronic and Electrical Equipment
e)	RTCA-DO-160 :	Environmental Conditions and Test Procedures for Airborne Equipment

Note: For equipment belonging to aircraft of Russian origin, the appropriate standards may be followed.

Appendix – E 1 : List of Documents & Data Required for Certification of Avionics

The following is a generic list of documents that needs to be generated by the supplier towards certification. The list of documents may vary based on the system, technology, criticality, scope of certification etc.

1. System Requirement Specification (SyRS) document
2. Technical Specification (TS) document
3. Interface Control Document (ICD)
4. Functional Requirements Specification (FRS) Document
5. Safety Assessment Document
6. Design Analysis Reports (Refer to Appendix C1)
7. Module Specification documents
8. Standard of Preparation (SoP)
9. Technical Specifications for Test Equipment
10. Acceptance of Test Equipment
11. Software related documents (in case the system has software)
12. CEH Related documents (in case the system has CEH like FPGA, CPLD, SoC)
13. First Article Inspection Report (In-case of ToT items)
14. Functional Test Procedure (FTP) Document
15. Functional Test Reports (FTR)
16. Safety of Flight Test Procedure (SOFTP) Document
17. Safety of Flight Test Reports (SOFTR)
18. Qualification Test Procedure (QTP) Document
19. Qualification Test Reports (QTR)
20. Lifing Documents
21. Maintenance Manuals
22. Repair and Overhaul Manuals
23. Reliability Report/data
24. Certificate of Conformance (CoC)
25. Declaration of Design and Performance (DDOP)

Note: Design Documents and Analysis reports listed above may vary from store to Store. Depending of the nature of the product, applicable documents may be included in the RFP.

Appendix – E 2 : List of Documents & Data Required for Certification of Aero-Mechanical systems and Armament

1. Technical Specification
2. Fatigue Life Spectrum
3. Installation and Interface Control Document
4. System Safety Analysis Report including FMECA, FTA, etc.
5. System Reliability Analysis
6. Functional Hazard Analysis
7. Performance Estimation/analysis
8. Static Stress Analysis
9. Fatigue life analysis Report
10. Thermal Analysis Report
11. Kinematic Analysis / Clearance Studies
12. CFD Analysis
13. Dynamic Analysis
14. Declaration of Design and Performance (DDP)
15. Certificate of Design(CoD)
16. Description and Operational Manual
17. Standard of Preparation/Component Build Standard
18. Illustrated Parts Catalogue
19. Environmental qualification test & Report
20. Functional performance Qualification test & reports
21. Endurance test & reports
22. EMI/EMC Test Plan and Report
23. Mil STD 704D Compliance (Aircraft Electrical Power Characteristics)
24. Qualification Test Procedures
25. Acceptance Test Procedures
26. Qualification Test Reports including test reports for storage/shelf life and Service life (Operational/Technical Life & Calendar life)
27. Acceptance Test Reports
28. Copy of Approval from Technical Airworthiness Authorities
29. Component Maintenance Manual
30. Design Change Notes / Modification details in Service
31. Flight Manuals (in case of Engines)
32. Reliability Report/data

Note: Design Documents and Analysis reports listed above may vary from store to Store. Depending of the nature of the product, applicable documents may be included in the RFP.

Appendix – E 3 : List of Documents & Data Required for Certification of Software & CEH

Software Documents		CEH Documents	
1.	Software Certification Plan	1.	CEH Certification Plan
2.	Software Verification Plan	2.	CEH Verification & Validation Plan
3.	Software Requirements Document	3.	CEH Requirements Document
4.	Software Verification Cases and Procedures	4.	CEH Design Document
5.	Software Verification Report	5.	CEH Verification Cases and Procedures
6.	Version Description Document	6.	CEH Verification Report
7.	IV&V recommendations	7.	Version Description Document
		8.	IV&V recommendations

Annexure – 1: Reference Checklist for Verification to Ensure Certification Requirements are Captured

Sl No	Activity	Yes/No
1.	Is Quality Management System requirement defined?	
2.	Has the System Engineering approach to product development emphaised?	
3.	Has criticality of the system defined?	
4.	Are all detailed Requirement Specification included?	
5.	Are all the necessary reviews, analysis, modelling requirements included?	
6.	Has the criteria for fabrication of the product including jigs and fixtures included?	
7.	Has the Software certification/CEH certification requirements and documentation included in RFP?	
8.	Has all Test reviews, equipment and their approval included?	
9.	Has the certification requirements during production included?	
10.	Has the maintenance, servicing and repair requirements included?	
11.	Is Continued Airworthiness requirement captured?	
12.	Are all required Documentation required included	
13.	Is AHSP identified and specified?	
14.	Are Tools, Testers and Ground Equipment included?	
15.	Has the operational and technical manuals included?	
16.	If Certification Authority has been specified and Certification Basis specified in RFP?	
17.	Are all Pre-RFP Certification Activities captured?	
18.	Has the requirement for Data Access to CEMILAC captured?	
19.	Is the Review and Audit clause is included?	
20.	Are Inclusion of Certification Requirement in derived RFPs captured?	
21.	Is GQA Agency identified and specified?	

Annexure - 2

Sample RFP Template incorporating the provisions in this guideline document

Annexure – 2 : Sample RFP Template incorporating the provisions in this guideline document

1. Selection of Sample Template

The format has been taken from DPM-2009 Appendix – C. This format has chosen since most of the revenue procurements like indigenization are taken up under the provisions of DPM-2009. Chapter – 4 of DPM-2009 gives the overall tendering process and section 4.8.2 "Preparation of Request for Proposal/Tender Enquiry" gives the detailed approach. Section 4.8.4 suggests the format given in Appendix – C to be followed. For procurement from foreign countries too, Section 9.7 of the DPM refers to Appendix – C for the RFP template.

2. Adopting DPM – 2009 Appendix C with regard to this guideline

The RFP template given in DPM-2009 Appendix – C has five parts. With regard to this guideline document, only few sections need be considered. The five parts of a typical RFP are:

Sl. No.	Part	Description	Remarks
1	Part I : General Instructions	Contains General Information and Instructions for the Bidders about the RFP such as the time, place of submission and opening of tenders, Validity period of tenders, etc.	The content in this guideline document has no specific considerations on this Part of RFP.
2	Part II : Essential Details of Items/Services required	Contains essential details of the items/services required, such as the Schedule of Requirements (SOR), Technical Specifications, Delivery Period, Mode of Delivery and Consignee details.	The content in this guideline document can be used to bring out airworthiness requirements when filling the following aspects of "2. Technical Details" of the Part II. (a) Specifications/drawings, as applicable (b) Technical details with technical parameters (c) Requirement of training/on-job training (d) Requirement of installation/commissioning (e) Requirement of Factory Acceptance Trials (FAT), Harbour Acceptance Trails

			(HAT) and Sea Acceptance Trials (SAT) (g) Nature of assistance required after completion of warranty (h) Requirement of pre-site/equipment inspection (i) Any other details, as considered necessary
3	Part III : Standard conditions of RFP	Contains Standard Conditions of RFP, which will form part of the Contract with the successful Bidder.	The content in this guideline document has no specific considerations on this Part of RFP.
4	Part IV : Special Conditions of RFP	Contains Special Conditions applicable to this RFP and which will also form part of the contract with the successful Bidder.	The content in this guideline document can be used to bring out airworthiness requirements when filling "Quality, Quality Assurance, Inspection authority, PDI, JRI, product support, AMC, ESP of this Part of RFP
5	Part V : Evaluation Criteria & Price Bid Issues	Contains Evaluation Criteria and Format for Price Bids.	The content in this guideline document has no specific considerations on this Part of RFP.

From the above it can be observed that Part II and Part IV have relevance with respect to airworthiness. Towards that, the following mapping between RFP sections and Guideline sections are list below:

Part	Section	Corresponding provision in Guideline document
Part - III	2. Technical Requirements	
	(a) Specifications/drawings, as applicable	ACR-RFP-A04
	(b) Technical details with technical parameters	ACR-RFP-A04
	(c) Requirement of training/on-job training	As per customer requirements
	(d) Requirement of installation/commissioning	As per customer requirements
	(e) Requirement of Factory Acceptance Trials (FAT),	ACR-RFP-A08
	(f) Requirement of Technical documentation	ACR-RFP-A11
	(g) Nature of assistance required after completion of warranty	As per customer requirements
	(h) Requirement of pre-site/equipment inspection	As per QA nominated by User.
	(i) Any other details, as considered necessary	
Part - IV	22. Quality	ACR-RFP- A01, ACR-RFP- A02, ACR-RFP-A20

	23. Quality Assurance	ACR-RFP- A01
	24. Inspection Authority	ACR-RFP- A20
	25. Pre Dispatch Inspection	As per QA nominated by User.
	26. Joint Receive Inspection	As per QA nominated by User.
	31. Annual Maintenance Contract (AMC) Clause	
	(i) Preventive Maintenance Service	ACR-RFP-A10
	(ii) Breakdown maintenance Service	ACR-RFP-A10
	32. Engineering Support Package (ESP) Clause	
	(a) Repair Philosophy (i) Field Repair (ii) Base Overhaul	ACR-RFP-A10
	(b) MRLS	ACR-RFP-A10
	(c) Special Maintenance Tools & Test Equipment	ACR-RFP-A14
	(d) Technical Literature	ACR-RFP-A11, ACR-RFP-A15
	(e) Misc Aspects	
	(f) Maintenance Evaluation Trials	ACR-RFP-A13

RFP Template with Example

In order to illustrate inclusion of the provisions of this guidelines document, a sample RFP has been prepared taking a GPS Receiver as an example. In the example, only Part – II and Part – IV are covered in details. For, Part – I, Part – IV & Part – V, which are largely commercial in nature, only headings are included for the sake of completeness.

Following aspects are considered while preparing the example RFP:

(i) Para 3 of Appendix – C clearly states that "*In Part II, the Technical Details would be different for various types of equipment. As such only the broad guidelines for formulating this aspect have been stated here."* This clearly gives leverage for the buyer to add specific technical points pertaining to the item/service being acquired. Hence the titles & contents under Appendix – C, Part -II Para 2 are suitably modified.

(ii) Appendix – C of DPM-2009 is for all clause of revenue procurements. Hence, for airborne procurements, where safety and airworthiness are paramount additional technical criteria are necessary to be included.

REQUEST FOR PROPOSAL FORMAT

(Particulars of the Buyer issuing the RFP)

Invitation of Bids for Supply of <u>Airborne GPS System</u>

Receiver Request for Proposal (RFP) No _____Dated_____

Part I – General information

1. **Last date and time for depositing the Bids:**
2. **Manner of depositing the Bids:**
3. **Time and date for opening of Bids:**
4. **Location of the Tender Box:**
5. **Place of opening of the Bids:**
6. **Two-Bid system:**
7. **Forwarding of Bids :**
8. **Clarification regarding contents of the RFP:**
9. **Modification and Withdrawal of Bids:**
10. **Clarification regarding contents of the Bids:**
11. **Rejection of Bids:**
12. **Unwillingness to quote:**
13. **Validity of Bids:**
14. **Earnest Money Deposit:**

Note : *The above may be appropriately filled by the buyer as per the organizational policies.*

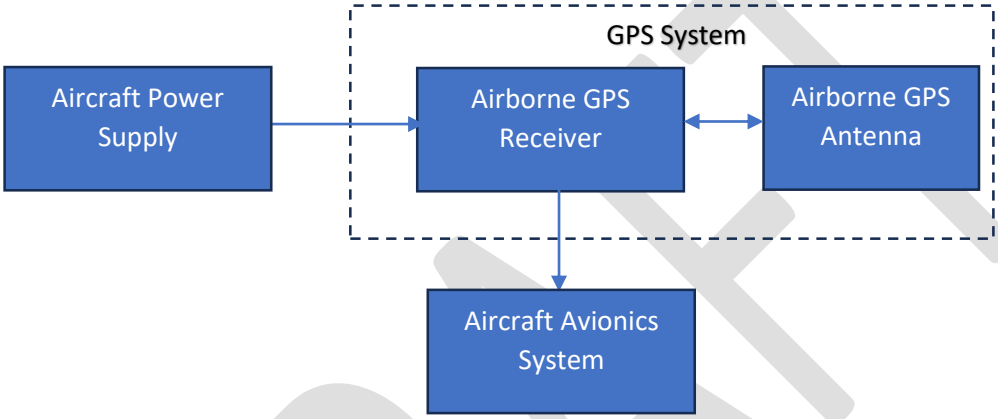
Part II – Essential Details of Items/Services required

1. Schedule of Requirements

The GPS System comprising of one set of each of the following:

Sl. No.	Item Name	Quantity
1	Airborne GPS Receiver	05
2	Airborne GPS Antenna	05
3	Aircraft Installation Kit	05

The GPS System is illustrated in the following figure:



2. Technical Requirements

GPS System in this RFP refers to the Airborne GPS receiver (henceforth called as *Receiver*), Airborne GPS Antenna (henceforth called the *Antenna*) and Aircraft Installation kit.

(a) Specifications

The following are the top level specifications of the ***Airborne GPS Receiver***:

GPS- Sys-Spec-01 : The GPS System shall be used for providing satellite based navigation for transport class of military aircraft.

GPS- Sys-Spec-02 : The receiver shall provide standard navigation output as per NEMA – 0183 over RS-422 interface

GPS- Sys-Spec-03 : The GPS System shall work for SNS constellation like GPS, Galileo, GLONASS and IRNSS

GPS- Sys-Spec-04 : The GPS System shall be treated as mission critical in nature.

GPS- Sys-Spec-05 : The GPS System shall be self-contained in all aspects except for on-board 28 Volt power supply.

GPS- Sys-Spec-06 : The *Receiver* shall have a self-test coverage of 95% of hardware.

GPS- Sys-Spec-07 : The GPS System shall have a MTBF not less than 3000 Hrs at an operating temperature of +55°C

GPS- Sys-Spec-08 : The *Receiver* shall meet all the functional and technical requirements as per RTCA-DO-291

GPS- Sys-Spec-09 : The Antenna shall meet all the functional and technical requirements as per RTCA-DO-301

(b) Technical parameters

The Technical Parameters of the receiver are given in table -1 below :

Performance Specifications			
GPS-Rxr-Spec-09	Type	:	1575.42 MHz L1, C/A code receiver with SBAS capability
GPS-Rxr -Spec-02	Position Update Interval	:	1 Hz (1 second)
GPS- Rxr -Spec-03	Sensitivity	:	Tracking : -140 dBm Reacquisition : 7 seconds typical at –130 dBm GPS
GPS- Rxr -Spec-04	1 PPS	:	30 ns, RMS
GPS- Rxr -Spec-05	Altitude	:	Maximum : 18000 metres
GPS- Rxr -Spec-06	Dynamics	:	Velocity : Maximum 513 m/s Accuracy : 0.1 m/s RMS
GPS- Rxr -Spec-07	TTFF (Time To First Fix)	:	Cold start : ≤ 120 seconds at –130 dBm Warm Start : 75 seconds at –130 dBm (typical)
GPS- Rxr -Spec-08	Integrity Monitoring	:	As per DO - 229
GPS- Rxr -Spec-09	Radiation Coverage	:	
Power Supply Specifications			
GPS- Rxr -Spec-010	Voltage	:	14 VDC to 28 VDC (nominal) 9-32 VDC (operational)
GPS- Rxr -Spec-011	Antenna Power Supply		5 VDC, 100 mA max
GPS- Rxr -Spec-012	Power		≤ 5.0 W
Interface Specifications			
GPS- Rxr -Spec-13	Connector	:	one DB-25 male, plug connector for digital data TNC Female
GPS- Rxr -Spec-13	Mount	:	Surface Mount with four hole pattern
Mechanical Specifications			
GPS- Rxr -Spec-14	Dimension	:	Depth : 200 mm(Max) Width : 120 mm (Max) Height : 50 cm (Max) (Without Connector)

GPS- Rxr - Spec-15	Weight	:	750 grams (Max)
GPS- Rxr - Spec-20	Platform	:	Transport Aircraft

The Technical Parameters of the antenna are given in the table-2 below:

Performance Specifications			
GPS- Ant-Spec-09	Frequency Range	:	1575 ±10 MHz
GPS- Ant -Spec-02	VSWR	:	≤ 2.0 : 1
GPS- Ant -Spec-03	Power	:	1W
GPS- Ant -Spec-04	Gain (dB)	:	38±1dB
GPS- Ant -Spec-05	Axial Ratio	:	3±0.5dB AT BORE SIGHT
GPS- Ant -Spec-06	Band Rejection	:	35±2dB@1650MHz
GPS- Ant -Spec-07	Impedance	:	50 Ω
GPS- Ant -Spec-08	Polarization	:	RIGHT HAND CIRCULAR
GPS- Ant -Spec-09	Radiation Coverage	:	Elevation Angle: Minimum Gain @ 0°: -7.5dBic @ 5°: -4.5dBic @ 10°: -3.0dBic @ 15°: -2.0dBic
GPS- Ant -Spec-010	Voltage	:	Minimum: +5 VDC Maximum: +18 VDC
GPS- Ant -Spec-11	Current	:	Typical: 45±5 mA Maximum: 75 mA
Interface Specifications			
GPS- Ant -Spec-12	Connector	:	TNC Female
GPS- Ant - Spec-13	Mount	:	Surface Mount with four hole pattern
Mechanical Specifications			
GPS- Ant - Spec-14	Dimension	:	Depth : 87.3 mm (Max) Width : 55.63 mm (Max) Height : 15.75 mm (Max) (Without Connector) Total Height : 32.25 mm (Max)
GPS- Ant - Spec-15	Weight	:	110 ±5 grams
GPS- Ant - Spec-16	Paint	:	White Polyurethane Coating – as per AMS-C-83445A (MIL-C_83445A), CLASS I

GPS- Ant - Spec-17	Colour	:	White
GPS- Ant - Spec-18	Finish	:	Gloss
GPS- Ant - Spec-19	Radome	:	Fiber Reinforced Glass Epoxy – as per MIL-R-7705B, Grade A
GPS- Ant - Spec-20	Platform	:	Fighter Aircraft

(d) Requirement for On Job training :
As per the buyer requirements.

(d) Requirement of installation :

i. The vendor shall carry out a feasibility study and prepare an installation design report covering the following:

a. Location of mounting the receiver
b. Location of mounting antenna with minimal interference with other antenna & line of sight
c. Cable routing schemes

ii. Based on the installation requirement, the vendor shall supply an Aircraft installation kit comprising of, but limited to, the following:

a. Aircraft Electrical & Signal Loom as per the required length along with necessary connectors
b. RF Cable assemblies as per the required length
c. Installation Brackets, mounting trays & necessary fasteners

(e) Certification, Qualification and Acceptance

i. Certification

a. CEMILAC and its nominated agencies would be the Certification Agency for the items developed under this project.
b. The certification of the items would be in accordance with Subpart C1 of IMTAR-21 and the associated regulations from other subparts.
c. The vendor shall provide all the necessary data necessary for certification of the items. Towards Certification, CEMILAC in association with the buyer may constitute design & test adequacy or result reviews.
d. In case the vendor is outsourcing any development, the sub-supplier shall also meet the requirements stated in this RFP.

ii. Qualification

a. Design & Development Process: The vendor shall ensure that structured engineering process may be followed during development process as per Annexure 21.C1.A. The vendor shall provide the Design, development and testing process in the RFP response.
b. Safety Assessment Process : From the utilization point of view, the GPS system is classified as Mission Critical. The vendor shall carry out detailed FMECA and reliability analysis. Failure modes that can have safety issues shall be eliminated by design. The reliability shall be in accordance with the reliability values specified in Part – II of the RFP.
c. The vendor shall prepare a technical detailed specification document derived from Part – II of the RFP.

d. PDR and CDR shall be carried out with subject mater experts, Technical Airworthiness Authorities and buyer agency experts as per the contractual timelines.
e. Software and Complex Electronics Hardware (CEH) shall follow Development Process in accordance with RTCA-DO-178 and RTCA-DO-254 respectively. The Design Assurance Level shall be Level – C. The vendor shall establish the an IV&V team to carry out independent reviews, analysis, audits and testing. The Software & CEH certification shall be planned along with certification agency.
f. Qualification Testing:
    1. One unit of the GPS Receiver and GPS Antenna shall be qualified to meet the environmental requirements. The qualification test procedures shall be in accordance with JSS-55555 or Mil-Std-810G. The power system compatibility and EMI/EMC shall be tested in accordance with Mil-Std-704F and Mil-Std-461G respectively.
    2. The vendor shall prepare a QTP document and Functional test plan document and subject the document to Test Adequacy Review Board constituted by the buyer.
    3. The tests shall be carried out in NABL Accredited testing labs and with test facilities duly calibrated.
    4. The list of tests are as follows which needs to be tailored based on location in the aircraft:
        (i) High Temperature
        (ii) Low Temperature
        (iii) Rapid/Explosive Decompression Test
        (iv) Altitude (Low Pressure)
        (v) Thermal Shock
        (vi) Humidity
        (vii) Combined Temperature, Altitude and Humidity (CTAH)
        (viii) Rain Drip
        (ix) Blowing Rain (For antenna)
        (x) Blowing Sand (For antenna)
        (xi) Settling Dust
        (xii) Salt fog
        (xiii) Icing & Hail Storm (For antenna)
        (xiv) Solar radiation (For Antenna)
        (xv) Fungus
        (xvi) Vibration
        (xvii) Gun Fire Vibration
        (xviii) Acceleration (Functional, Structural and Crash)
        (xix) Mechanical Shock (functional, crash, transit drop, bench handling)
        (xx) Contamination resistance
        (xxi) EMI/EMC (Conducted/Radiated Susceptibility/Emission)
        (xxii) Power Supply Compatibility

(xxiii) Indirect Effects of Lightning

(xxiv) Electro Static Discharge

(xxv) Aerodynamic Load Test (for Antenna)

iii. Acceptance

The items would be accepted by the buyer on fulfilment of all the technical and commercial clauses as per the Purchase Order.

(f) Technical documentation

The following technical documentation shall be prepared, properly review and submitted during the development lifecycle.

1. System Requirement Specification (SyRS) document
2. Installation Analysis Report
3. Technical Specification (TS) document
4. Interface Control Document (ICD)
5. Functional Requirements Specification (FRS) Document
6. Safety Assessment Document
7. Design Analysis Reports (Refer to Appendix C1)
8. Module Specification documents
9. Standard of Preparation (SoP)
10. Technical Specifications for Test Equipment
11. Acceptance of Test Equipment
12. Software related documents (in case the system has software)
    a. Software Certification Plan
    b. Software Verification Plan
    c. Software Requirements Document
    d. Software Verification Cases and Procedures
    e. Software Verification Report
    f. Version Description Document
    g. IV&V recommendations
13. CEH Related documents (in case the system has CEH like FPGA, CPLD, SoC)
    a. CEH Certification Plan
    b. CEH Verification & Validation Plan
    c. CEH Requirements Document
    d. CEH Design Document
    e. CEH Verification Cases and Procedures
    f. CEH Verification Report
    g. Version Description Document
    h. IV&V recommendations

14. First Article Inspection Report
15. Functional Test Procedure (FTP) Document
16. Functional Test Reports (FTR)
17. Safety of Flight Test Procedure (SOFTP) Document
18. Safety of Flight Test Reports (SOFTR)
19. Qualification Test Procedure (QTP) Document
20. Qualification Test Reports (QTR)
21. Declaration of Design and Performance (DDOP)

(g) Nature of assistance required after completion of warranty

1. The vendor shall provide continued support by way of timely repair of the faulty units. Standard repair schemes shall be made available to the buyer.
2. The cost of repair shall be on pro-rata basis for the standard repair schemes.

(h) Requirement of pre-site/equipment inspection

(i) Any other details, as considered necessary

3. Two-Bid System

Para of RFP specifications item-wise	Specification of item offered	Compliance to RFP specification – whether Yes / No	In case of non-compliance, deviation from RFP to be specified in unambiguous terms

4. Delivery Period

5. INCOTERMS for Delivery and Transportation

6. Consignee details

Note : The Points 3-6 above may be appropriately filled by the buyer as per the organizational policies.

Part III – Standard Conditions of RFP

1. **Law :**
2. **Effective Date of the Contract :**
3. **Arbitration :**
4. **Penalty for use of Undue influence :**
5. **Agents / Agency Commission :**
6. **Access to Books of Accounts :**
7. **Non-disclosure of Contract documents :**
8. **Liquidated Damages :**
9. **Termination of Contract :**
10. **Notices :**
11. **Transfer and Sub-letting :**
12. **Patents and other Industrial Property Rights :**
13. **Amendments :**
14. **Taxes and Duties :**
15. **Pre-Integrity Pact Clause :**

Note *: The above may be appropriately filled by the buyer as per the organizational policies.*

Part IV – Special Conditions of RFP

1. **Performance Guarantee** :
2. **Option Clause :**
3. **Repeat Order Clause :**
4. **Tolerance Clause :**
5. **Payment Terms for Indigenous Sellers :**
6. **Payment terms for Foreign Sellers –**
7. **Advance Payments :**
8. **Paying Authority :**
9. **Fall clause :**
10. **Exchange Rate Variation Clause :**
11. **Risk & Expense clause –**
12. **Force Majeure clause :**
13. **13. Buy-Back offer –**
14. **Specification :**
15. **OEM Certificate :**
16. **Export License :**
17. **Earliest Acceptable Year of Manufacture :**
18. **Buyer Furnished Equipment :**
19. **Transportation :**
20. **Air lift :**
21. **Packing and Marking:**

    The contractor shall ensure that the stores reach the consignee in perfect serviceable and ready to use condition by use of approved transit boxes.

    The following details are to be marked on the unit by the manufacturer.

    a) Part Number: (As given in Type Approval)
    b) Serial Number:
    c) Manufacturing Agency: (Name of the agency as given in Type Approval).

22. **Quality :**
    i. The vendor shall have a valid AS9100D accreditation (or) DGAQA AFQMS at the time of bidding and shall continue be valid till supply of all items.
    ii. All materials and components used for the manufacture of the item shall be of airborne grade and conform to latest relevant IS/JSS/BS/DEF and shall be capable of withstanding environmental conditions of fighter aircraft. If IS/JSS/BS/DEF specifications do not exist then the MIL-HDBK-5400 and MIL-HDBK-454 may be used as guidelines.
    iii. Once the list of components and materials has been finalised, no change to this or deviations from it shall be made by the manufacturer without the prior permission of the certification and quality assurance agencies.

23. **Quality Assurance :**

    The vendor shall interact with DGAQA/ORDAQA and prepare the Quality Assurance Plan document to be followed during development and production process. The QA Plan shall address, the following :

a. Raw Materials - Pre Inspection

i. The contractor/ manufacturer shall maintain inspection/batch acceptance document pertaining to raw materials and components.

ii. The batch number, date of manufacturer, shelf life/ expiry date and certificate of conformance to technical specifications shall be maintained.

b. Stage Inspection

i. Components, materials, sub- assemblies, parts etc. shall be inspected at various stages of assembly of the sets to ensure that they conform to the requirements of the appropriate drawings and specifications.

ii. All items not meeting the requirements shall be rejected.

c. Process Control

i. Relevant material and process documents such as Raw Material Specification, Process Control Document or Inspection Sheets shall be listed and made available in the Standard of Preparation (SoP).

ii. The vendor bears the sole responsibility of fabrication and must take all the necessary steps to ensure the desired qualities in conformance with requirements throughout the production phase and during production for supplying to the clients.

iii. At the end of fabrication and for the clearance of each delivery, the inspection and quality assurance procedures which are to be followed by the supplier must include the following:

- Visual Inspection
- Acceptance Tests

All production Unit shall be subjected to Acceptance Tests by the buyer and DGAQA.

24. Inspection Authority :

The inspection authority will be DGAQA and its nominated field establishments.

25. Pre-Dispatch Inspection :

26. Joint Receipt Inspection :

27. Franking clause :

28. Claims :

29. Warranty :

30. Product Support :

a. The vendor shall provide all necessary maintenance & servicing schedules like :
   i. Component Maintenance Manual (CMM),
   ii. Trouble Shooting Manual (TSM),
   iii. Illustrated Parts Catalogue (IPC),
   iv. Consumable Materials List (CML).

b. The relevant Tools, Testers and Ground Testing equipment for O – Level & I-Level maintenance activities shall also be supplied. The testers and ground testing equipment shall have the approvals of DGAQA.

31. Annual Maintenance Contract (AMC) Clause :

32. Engineering Support Package (ESP) clause :
33. Price Variation (PV) Clause

Note : *Any of the above points without any content may be appropriately filled by the buyer as per the organizational policies*.

Part V – Evaluation Criteria & Price Bid issues

1. Evaluation Criteria -
2. Price Bid Format:

Note : *The points above may be appropriately filled by the buyer as per the organizational policies.*