



TENDER NO: NAL/PUR/ALD/100/20-Z[G]

Date: 05-Jul-2021

TENDER DOCUMENT

FOR

PROCUREMENT OF AVIONICS SUITE FOR SARAS MKII

COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH
NATIONAL AEROSPACE LABORATORIES
PB NO.1779, HAL AIRPORT ROAD, BENGALURU – 560017
KARNATAKA-INDIA



Council of Scientific and Industrial Research
National Aerospace Laboratories
PB No.1779, HAL Airport Road, Bengaluru – 560 017, Karnataka-India
Tel #: 00 91 80 25086040/6041
Fax #: 00 91 80 25269611
Email: purchasek@nal.res. in
Website: www.nal.res.in

Invitation for e-Bids / Notice Inviting e-Tender

CSIR- National Aerospace Laboratories (NAL), Bengaluru, India is one of the premier laboratories under Council of Scientific and Industrial Research, an autonomous body under Department of Scientific and Industrial Research (Government of India), New Delhi. CSIR-NAL is a Science and Knowledge based Research, Development and Consulting Organization. It is internationally known for its excellence in Scientific Research in Aerospace Engineering.

The Director, CSIR-NAL invites sealed bids from their Manufacturers, their distributors and Indian Agent of Foreign Principals, if any, for the procurement of the following Goods/Services for its day-to-day research. The Technical specifications, allied requirements and scope of supply are given in **Chapter 4** appended herewith.

Sr. No.	Tender No.	Brief Description of item(s)	Unit	Quantity	Single / Two Bid
1	NAL/PUR/ALD/100/20-Z[G]	Procurement of Avionics Suite for SARAS MKII	Details as per Chapter-4 and BoQ		Two

- Interested Bidders may obtain further information from the office of the:
Controller of Stores & Purchase
Purchase Section
CSIR- National Aerospace Laboratories
PB No.1779, HAL Airport Road, Kodihalli, Bengaluru – 560017
Karnataka-India
Tel #: 080 25086040/6041/6044
Fax #: 080 25269611
Email : purchasek@nal.res.in, mkala@nal.res.in
- E-Bids are invited through the electronic tendering process and the Tender Document can be downloaded from the e-Tender Central Public Procurement Portal (CPPP) of Government of India, <https://etenders.gov.in>. **The submission of e-Bids will be only through the e-Tender portal <https://etenders.gov.in>. Bids will not be accepted in any other form.**
- The prospective bidders should adhere to deadlines specified in Tender Details Screen corresponding to this Tender on E-Tender portal <https://etenders.gov.in>.
- The Interested bidders should submit Non-Disclosure Agreement (NDA) before attending the pre-bid meeting and the bidders who have submitted NDA only will be able to participate in the pre-bid Meeting and those bidders only can submit the tender. The other bidders will be rejected, if submitted. NDA to be printed/executed on company's letter-head and signed by the bidders on both sides of each page.

Successful Bidder should submit NDA duly registered as per Stamp Act of India before placement of Purchase Order.

	Date	Time in hours (IST)
Submission of NDA [on or before]	09-July-2021	11:00
Approval of NDA	09-July-2021	12:00

5. (a) A Pre-Bid Conference will be held on schedule as mentioned below.

	Date	Time in hours (IST)	Venue
Pre-Bid Conference	16-July-2021	11:00	THROUGH WEBEX
<p>Bidders desirous of attending Pre-bid meeting are required to provide the following details: -</p> <ol style="list-style-type: none"> 1. Bidders Name & address 2. Name, designation & mobile number of the representative (s) attending the meeting. 3. E-mail ID to which the meeting invitation to be sent. 4. Pre-bid queries, if any. <p>The above information should be sent by e-mail to mkala@nal.res.in/ purchasek@nal.res.in on or before 14-Jul-2021 (11:00 Hrs).</p>			

(b) Queries received after pre-bid will not be considered.

6. The Bid prepared by the Bidder shall include the following: -

Bid Security (BS) / Earnest Money Deposit (EMD)	
a)	EMD Amount: NIL BIDDER TO SUBMIT BID SECURING DECLARATION. Refer Annexure-B, Chapter -8]
b)	The Bid Security Declaration in the name of “The Director, National Aerospace Laboratories, Bengaluru” to be part of the Technical Bid, failing which the bid is liable to be rejected. For further details, refer Tender document.
c)	Forms as specified in Chapter No.8

7. The Schedule for Submission of e-Bids and Opening of e-Bids is as follows: -

Date & Time of Submission of e-Bid		Date and Time of Opening of e-Bid		Venue
Date	Time (IST)	Date	Time (IST)	As detailed at Sr. No.1
02-Aug-2021	10:00 Hrs	03-Aug-2021	11:00 Hrs	

8. Kindly refer Government of India Procurement Policies issued from time to time with regards to MSE and Make in India from DPIIT and Ministry of Finance.

9. In case of agents quoting in offshore procurements, on behalf of their principal manufacturers, one agent cannot represent two manufacturers or quote on their behalf in a particular tender enquiry. One manufacturer can also authorize only one agent/ dealer. There can be only one bid from the following:

i)	The Principal manufacturer directly or through one Indian agent on his behalf; and
ii)	Indian/foreign agent on behalf of only one principal.

10. The bidders proposing to supply finished products directly/indirectly from Bidders of Countries sharing the land border with India should submit copy of registration done with the Ministry of Home Affairs and Ministry of External Affairs.

11. If the products supplied are not from Bidders of Countries sharing Land border with India, the Bidders should enclose a declaration. The bids of those bidders failing to comply with the above clauses will be summarily rejected.

12. The Director, CSIR-National Aerospace Laboratories (NAL), Bengaluru, India reserves the right to accept or reject any bids or accept all tenders either in part or in full or to split the order, or to annul the bidding process without assigning any reasons there for.

General Instructions to Bidders: -

01. Tender Documents may be downloaded from Central Public Procurement Portal <https://www.etenders.gov.in>. Aspiring Bidders who have not enrolled/ registered in e- procurement should enroll/ register before participating through the website <https://www.etenders.gov.in>. The portal enrolment is free of cost. Bidders are advised to go through instructions provided at 'Instructions for online Bid Submission'.
02. Tenderers can access tender documents on the website (For searching in the NIC site <https://www.etenders.gov.in>, kindly go to Tender Search option, select tender type and select ' Council of Scientific and Industrial Research' in organization tab and select NAL-Bengaluru-CSIR' in department type Thereafter, Click on "Search" button to view all CSIR-NAL, Bengaluru tenders). Select the appropriate tender and fill them with all relevant information and submit the completed tender document online on the website <https://www.etenders.gov.in> as per the schedule given in the next page.

03. The Bidders should have Java 8 update 231 version-32 bit for uploading the bid in the CPP Portal.

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CHAPTER - 1

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A Introduction

Instructions to bidder are broad guidelines to be followed while formulating the bid and its submission to the Purchaser. It also describes the methodology for opening and evaluation of bids and consequent award of contract.

1.1. Eligible Bidders

1.1.1 This Invitation for Bids is open to all suppliers' **subject to para 07** of the invitation for e-Bids/NIT.

1.1.2 A supplier or bidder shall be considered to be from a country if (i) the entity is incorporated in that country, or ii) a majority of its shareholding or effective control of the entity is exercised from that country; or (iii) more than 50% of the value of the item being supplied has been added in that country. Indian suppliers shall mean those entities which meet any of these tests with respect to India.

1.1.3 MSEs would be treated as owned by Scheduled Caste/Schedule Tribe enterprises as under:

(a)	In case of proprietary MSE, proprietor(s) shall be SC/ST.
(b)	In case of partnership MSE, the SC/ST partners shall be holding at least 51% (Fifty One percent) shares in the unit.
(c)	In case of Private Limited Companies, at least 51% (fifty one percent) share shall be held by SC/ST promoters.

1.1.4 MSEs owned by women shall also be determined as per the above analogy/criteria.

1.1.5 Bidders should not be associated, or have been associated in the past, directly or indirectly, with a firm or any of its affiliates which have been engaged by the Purchaser to provide consulting services for the preparation of the design, specifications, and other documents to be used for the procurement of the goods to be purchased under this Invitation of Bids.

1.1.6 Bids from Joint Ventures, Consortium or Associations so long as they are formed and registered prior to the bid submission date.

1.1.7 The bidders who have been temporarily suspended or removed from the list of registered suppliers by the purchaser or banned from Ministry/country wide procurement **shall be ineligible** for participation in the bidding process.

1.2 Cost of Bidding

1.2.1 The Bidder shall bear all costs associated with the preparation and submission of its bid, and "the Purchaser", will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.

1.3 Code of Integrity

1.3.1 The bidders/suppliers should sign a declaration about abiding by the Code of Integrity for Public Procurement in bid documents. In case of any transgression of this code, the bidder is not only liable to be removed from the list of registered suppliers, but it would be liable for other punitive actions such as cancellation of contracts, banning and blacklisting or action in Competition Commission of India, and so on.

1.3.2 **Code of integrity for Public Procurement:** The Purchaser as well as bidders, suppliers, contractors and consultants should observe the highest standard of ethics and should not indulge in the following prohibited practices, either directly or indirectly, at any stage during the procurement process or during execution of resultant contracts:

i)	"Corrupt practice"	making offers, solicitation or acceptance of bribe, rewards or gifts or any material benefit, in exchange for an unfair advantage in the procurement process or to otherwise influence the procurement process or contract execution;
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ii)	"Fraudulent practice"	any omission or misrepresentation that may mislead or attempt to mislead so that financial or other benefits may be obtained or an obligation avoided. This includes making false declaration or providing false information for participation in a tender process or to secure a contract or in execution of the contract;
iii)	"anti-competitive practice"	any collusion, bid rigging or anti-competitive arrangement, or any other practice coming under the purview of the Competition Act, 2002, between two or more bidders, with or without the knowledge of the purchaser, that may impair the transparency, fairness and the progress of the procurement process or to establish bid prices at artificial, non-competitive levels;
iv)	"coercive practice"	harming or threatening to harm, persons or their property to influence their participation in the procurement process or affect the execution of a contract;
v)	"conflict of interest":	participation by a bidding firm or any of its affiliates that are either involved in the consultancy contract to which this procurement is linked; or if they are part of more than one bid in the procurement; or if the bidding firm or their personnel have relationships or financial or business transactions with any official of purchaser who are directly or indirectly related to tender or execution process of contract; or improper use of information obtained by the (prospective) bidder from the purchaser with an intent to gain unfair advantage in the procurement process or for personal gain; and
vi)	"Obstructive practice"	materially impede the purchaser's investigation into allegations of one or more of the above mentioned prohibited practices either by deliberately destroying, falsifying, altering; or by concealing of evidence material to the investigation; or by making false statements to investigators and/or by threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or by impeding the purchaser's Entity's rights of audit or access to information;

1.3.3 Obligations for Proactive disclosures

i)	The Purchaser as well as bidders, suppliers, contractors and consultants, are obliged under Code of Integrity for Public Procurement to sue-moto proactively declare any conflicts of interest (coming under the definition mentioned above – pre-existing or as and as soon as these arise at any stage) in any procurement process or execution of contract. Failure to do so would amount to violation of this code of integrity; and
ii)	The bidder must declare, whether asked or not in a bid document, any previous transgressions of such a code of integrity with any entity in any country during the last three years or of being debarred by any other Procuring Entity. Failure to do so would amount to violation of this code of integrity;
iii)	To encourage voluntary disclosures, such declarations would not mean automatic disqualification for the bidder making such declarations. The declared conflict of interest would be evaluated and mitigation steps, if possible, taken by the purchaser.

1.3.4 Punitive Provisions

Without prejudice to and in addition to the rights of the Purchaser to other penal provisions as per the bid documents or contract, if the Purchaser comes to a conclusion that a (prospective) bidder/supplier, directly or through an agent, has violated this code of integrity in competing for the contract or in executing a contract, the purchaser may take appropriate measures including one or more of the following:

i)	If bids are under consideration in any procurement:	
	a)	Forfeiture or encashment of bid security;
	b)	Calling off of any pre-contract negotiations; and
	c)	Rejection and exclusion of the bidder from the procurement process.
ii)	If a contract has already been awarded	
	a)	Cancellation of the relevant contract and recovery of compensation for loss incurred by the purchaser;
	b)	Forfeiture or encashment of any other security or bond relating to the procurement;
	c)	Recovery of payments including advance payments, if any, made by the purchaser along with interest thereon at the prevailing rate.
iii)	Provisions in addition to above:	
	a)	Removal from the list of registered suppliers and banning/debarment of the bidder from participation in future procurements of the purchaser for a period not less than one year;
	b)	In case of anti-competitive practices, information for further processing may be filed under a signature of the Joint Secretary level officer, with the Competition Commission of India;
	c)	Initiation of suitable disciplinary or criminal proceedings against any individual or staff found responsible.

B. The Bidding Documents

1.4 Cost of Tender Documents

- 1.4.1 The bidding documents are to be **downloaded Free of Cost** from the website of **CPP Portal** <https://etenders.gov.in> or www.nal.res.in.

1.5 Content of Tender Documents

- 1.5.1 The goods required, bidding procedures and contract terms are prescribed in the bidding documents which should be read in conjunction. The bidding documents, apart from the invitation for bids and Critical Date Sheet have been divided into 8 Chapters as under:

Chapter No.	Name of the Chapter	
1	Instructions to Bidder (ITB)	
2	General Conditions of Contract (GCC) and Special Condition of Contract (SCC)	
3	Schedule of Requirements	
4	Specifications and Allied Technical Details	
5	Price Schedule Forms	
6	Qualification requirements	
7	Contract Form	
8	Other Standard Forms comprising	
	(i)	Bid Security Form
	(ii)	Bid Securing declaration
	(iii)	Bidder Information Form
	(iv)	Manufacturer's Authorization Form (MAF);
	(v)	Performance Statement form
	(vi)	Service Support details;
	(vii)	Format for declaration by the bidder for code of integrity and conflict of interest
	(viii)	Deviation Statement Form;
	(ix)	Bid form
	(x)	Performance Security Form;
	(xi)	Acceptance Certificate Form
	(xii)	Integrity pact

- 1.5.2 The Bidder is expected to examine all instructions, forms, terms, and specifications in the bidding documents. Failure to furnish all information required by the bidding documents or submission of a bid not substantially responsive to the bidding documents in every respect will be at the Bidder's risk and may result in rejection of its bid.

1.6 [Clarification of tender documents](#)

- 1.6.1 A prospective Bidder requiring any clarification of the Bidding Documents shall contact the Purchaser in writing at the Purchaser's address specified in the Special Conditions of Contract (SCC), latest by the date specified in the critical date sheet. No request for clarification or query shall normally be entertained after the deadline/pre-bid conference if any. Should the Purchaser deem it necessary to amend the Tender Documents as a result of a clarification, it shall do so following the procedure under Clause relating to amendment of Tender Documents and Clause relating to Deadline for Submission of Bids.
- 1.6.2 The queries, clarifications and amendments issued would also be hosted on the website of the **CPP Portal/Purchaser** for the benefit of the other prospective bidders and also shall be sent to all bidders who have purchased the tender documents.

1.7 [Amendment of Tender Documents](#)

- 1.7.1 At any time prior to the deadline for submission of bids, the Purchaser may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, modify the tender documents by amendment. The same would also be hosted on the website of the **CPP Portal/Purchaser** and all prospective bidders are expected to surf the website before submitting their bids to take cognizance of the amendments.
- 1.7.2 All prospective bidders who have down loaded the Tender Document should surf website of **CPP Portal/Purchaser** from time to time to know about the changes / modifications in the Tender Document. The changes / modifications would also be hosted on the website of **CPP Portal/Purchaser**. All prospective bidders are expected to surf the website of **CPP Portal/Purchaser** before formulating and submitting their bids to take cognizance of the amendments.
- 1.7.3 In order to allow prospective bidders' reasonable time in which to take the amendment into account in preparing their bids, the Purchaser, at its discretion, may extend the deadline for the submission of bids and host the changes on the website of **CPP Portal/Purchaser**.

[C. PREPARATION OF BIDS](#)

1.8. [Language of Bid](#)

- 1.8.1 The bid prepared by the Bidder, as well as all correspondence and documents relating to the bid exchanged by the Bidder and the Purchaser shall be written in English language only.
- 1.8.2 The Bidder/Supplier shall bear all costs of translation, if any, to the English language and bear all risks of the accuracy of such translation, for documents provided by the Bidder/Supplier.

1.9 [Purchase Preference Policies](#)

- 1.9.1 The purchaser intends to give product reservation/purchase preference/price preference in line with current Govt. of India procurement policies to help inclusive national economic growth by providing long term support to Small and Medium enterprises (SMEs) and disadvantaged sections of the society and to address environmental concerns along with preferential market access in govt. procurements.
- 1.9.2 For the above purpose, local supplier means a supplier or service provider whose product or service offered for procurement meets the minimum local content as prescribed in DIPP Order No. P-45021/2/2017-PP (BE-II) dated 28th May, 2018 or by the competent Ministries/Departments in pursuance of this order and local content means the amount of value added in India which shall, unless otherwise prescribed by the Nodal Ministry, be the total value of the items procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent.

1.10.1 Documents comprising the E-bid

The bid prepared by the Bidder shall include documents as under:

Sr. No.	Required documents
A. TECHNICAL BID	
(a)	Bidder Information Form;
(b)	Declaration abiding by the Code of Integrity and no conflict of interest for public procurement;
(c)	Bid security as specified in the Invitation to Bids;
(d)	Service support details form;
(e)	Deviation Statement Form;
(f)	Performance Statement Form;
(g)	Manufacturer's Authorization Form along with a certified copy of the Agency Agreement between the bidders and the Indian Agent;
(h)	Documentary evidence establishing that the bidder is eligible to bid and is qualified to perform the contract if its bid is accepted;
(i)	Integrity Pact, if required;
(j)	Documents establishing goods eligibility and conformity to bidding documents; indicating the Indian Customs Tariff Number (ICT & HSN No.) .
(k)	Schedule of requirements.
(l)	Self-certification that the item offered meets the minimum local content of 50% giving details of the location(s) at which the local value addition is made in case the bidder wishes to avail the benefits under the make in India policy, if applicable.
(m)	In cases of procurement for a value in excess of ₹ 10 crores, the local supplier shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content to avail the benefits under the make in India policy, if applicable.
(n)	Documentary evidence about the status of the bidder i.e. whether MSE or not, owned by SC/ST or not and whether the MSE is owned by a women entrepreneur or not.
B. PRICE BID	
(i)	Bid form;
(ii)	Applicable Price Schedule Form;

1.11. Bid form and price schedule

1.11.1 The bidder shall complete the Bid Form and the appropriate price schedule form furnished in the bidding documents. These forms must be completed without any alterations to its format and no substitutes shall be accepted. All blank spaces shall be filled in with the information requested. The Bid Form and the appropriate Price Schedule form shall be submitted in accordance with Clause 1.18.3 of the bidding documents.

1.12. Bid Prices

1.12.1 The Bidder shall indicate on the appropriate price schedule form, the unit prices and total bid prices of the goods it proposes to supply under the contract.

1.12.2 Prices indicated on the price-schedule form shall be entered separately in the following manner:

(a)	For Goods manufactured within India	
	(i)	The price of the goods quoted Ex-works including taxes already paid.
	(ii)	GST and other taxes, if any which will be payable on the goods if the contract is awarded
	(iii)	The charges for inland transportation, insurance and other local services required for delivering the goods at the desired destination as specified in the price schedule form.
	(iv)	Wherever applicable, the cost towards the installation, commissioning, spares,

		extended warranty, AMC/CMC, site preparation and training including any incidental services, if any.
(b)	For Goods manufactured abroad	
	(i)	The price of the goods, quoted on FCA (named place of delivery abroad) or FOB (named port of shipment), as specified in the price schedule form.
	(ii)	The charges for insurance and transportation of the goods to the port / place of destination both by Air/Sea.
	(iii)	The agency commission charges, if any.
	(iv)	Wherever applicable, the cost towards the installation, commissioning, spares, extended warranty, AMC/CMC, site preparation and training including any incidental services, if any.

1.12.3 The terms FOB, FCA, CIF, CIP etc. shall be governed by the rules prescribed in the current edition of the Incoterms published by the International Chambers of Commerce, Paris.

1.12.4 Where **there is no mention of packing, forwarding, freight, insurance charges, taxes etc. such offer shall be rejected as incomplete.**

1.12.5 The price quoted shall remain fixed during the contract period and shall not vary on any account

1.12.6 All lots and items must be listed and priced separately in the Price Schedules. If a Price Schedule shows items listed but not priced, their prices shall be assumed to be included in the prices of other items. Lots or items not listed in the Price Schedule shall be assumed to be not included in the bid.

1.12.7 (a) The Purchaser is registered with Dept. of Scientific & Industrial Research, Govt. of India and concessional customs duty and GST & IGST are leviable vide notification No. 54/2002-Customs on all imports covered under Notification No.51/96-Customs dated 23.07.1996, Notification No.47/2017-Integrated Tax (Rate) and Notification No. 45/2017-Central Tax (Rate) both dated 14th November, 2017.

(b) The Certificates is issued without any commitment by CSIR-NAL. Hence, the supplier should ensure its applicability for their own interest.

1.12.8 Please state specifically in your offer whether the duties and taxes are extra over the prices quoted, failing which it will be presumed that the prices are inclusive of taxes and duties and no claim would be entertained for statutory variations at a later date.

1.12.9 Stipulations like "GST is presently not applicable but the same will be charged if it becomes leviable later on" is not acceptable unless in such cases it is clearly stated that GST will not be charged if the same becomes applicable later on due to increase in turn over etc. If a bidder fails to comply with this requirement, his quoted price shall be loaded with the quantum of duty which is normally applicable on the item in question for the purpose of comparison with the prices of other tenderers.

Note: All payments due under the contract shall be paid after deduction of statutory levies at source (like TDS, Income-tax etc.), wherever applicable.

1.13. Bid Currencies

1.13.1 Prices shall be quoted in Indian Rupees for offers received for supply within India and in freely convertible foreign currency in case of offers received for supply from foreign countries i.e. domestic tenderers are to quote and accept their payment in Indian currency; Indian agents of foreign suppliers are to receive their agency commission in Indian currency; cost of imported goods & services rendered in India, which are directly imported against the contract, may be quoted in foreign currency (currencies).

1.14. Documents Establishing Bidder's Eligibility and qualifications

1.14.1 The bidder shall furnish, as part of its bid, documents establishing the bidders' eligibility to bid and its qualification to perform the contract if its bid is accepted.

1.14.2 The documentary evidence of the bidder's qualification to perform the contract if the bid is accepted shall establish to the purchaser's satisfaction that;

(a)	The bidder meets the qualification criteria listed in bidding documents if any.
(b)	Bidder who doesn't manufacture the goods it offers to supply shall submit Manufacturers' Authorization Form (MAF) using the form specified in the bidding document to demonstrate that it has been duly authorized by the manufacturer of the goods to quote and/or supply the goods
(c)	In case a bidder not doing business within India, it shall furnish the certificate to the effect that the bidder is or will be represented by an agent in India equipped and able to carry out the supply, maintenance, repair obligations etc. during the warranty and post warranty period or ensure a mechanism at place for carrying out the supply, maintenance, repair obligations etc. during the warranty and post-warranty period.

1.14.3 Conditional tenders shall not be accepted.

1.15 Documents Establishing Goods' Eligibility and Conformity to Bidding Documents

1.15.1 To establish the goods' eligibility, the documentary evidence of the goods and services eligibility shall consist of a statement on the country of origin of the goods and services offered which shall be confirmed by a certificate of origin at the time of shipment.

1.15.2 To establish the conformity of the goods and services to the specifications and schedule of requirements of the bidding document, the documentary evidence of conformity of the goods and services to the bidding documents may be in the form of literature, drawings and data, and shall consist of:

(a)	A detailed description of the essential technical and performance characteristics of the goods;
(b)	A list giving full particulars, including available sources and current prices, of spare parts, special tools, etc., necessary for the proper and continuing functioning of the goods during the warranty period following commencement of the use of the goods by the Purchaser in the Priced-bid; and
(c)	An item-by-item commentary on the Purchaser's Technical Specifications demonstrating substantial responsiveness of the goods and services to those specifications or a statement of deviations and exceptions to the provisions of the Technical Specifications.

1.15.3 For purposes of the commentary to be furnished pursuant to above, the Bidder shall note that standards for workmanship, material and equipment, designated by the Purchaser in its Technical Specifications are intended to be descriptive only and not restrictive. The Bidder may substitute these in its bid, provided that it demonstrates to the Purchaser's satisfaction that the substitutions ensure substantial equivalence to those designated in the Technical Specifications.

1.15.4 Alternate offers/makes/models would not be considered.

1.16 Bid Security

1.16.1 The Bidder shall furnish, as part of its bid, a bid security (BS) for an amount as specified in the Invitation for Bids. In the case of foreign bidders, the BS shall be submitted either by the principal or by the Indian agent and in the case of indigenous bidders; the BS shall be submitted by the manufacturer or their specifically authorized dealer/bidder.

1.16.2 The bid security is required to protect the Purchaser against the risk of Bidder's conduct, which would warrant the security's forfeiture.

1.16.3 The bid security shall be in Indian Rupees for offers received for supply within India and denominated in the currency of the bid or in any freely convertible foreign exchange in the case of offers received for supplies from foreign countries in equivalent Indian Rupees. The bid security shall be in one of the following forms at the bidders' option:

(a)	A Bank guarantee or stand-by Letter of Credit issued by a Nationalized/ Scheduled bank located in India or a Foreign bank with its operating branch in India in the form provided in the bidding documents or
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(b)	A Banker's cheque or Account Payee demand draft in favour of the purchaser issued by any Nationalized/ Scheduled bank or
(c)	A Fixed Deposit Receipt pledged in favour of the Director, CSIR-NAL, Bengaluru.
(d)	Bid Securing Declaration

1.16.4 The bid security shall be payable promptly upon written demand by the purchaser in case the conditions listed in the ITB clause 1.16.9 are invoked.

1.16.5 The bid security should be submitted in its original form to the address mentioned below:-

CONTROLLER OF STORES & PURCHASE
CSIR-NATIONAL AEROSPACE LABORATORIES
PB NO.1779, HAL AIRPORT ROAD, KODIHALLI,
BENGALURU – 560017
KARNATAKA-INDIA

Scanned Copy of Demand Draft/Bank Guarantee towards bid security should be uploaded along with the E-bid.

1.16.6 The bid security of unsuccessful bidder will be discharged /returned as promptly as possible positively **within a period of 30 days after the expiration of the period of bid validity or placement of order whichever is later, without any interest.**

1.16.7 **The successful Bidder's bid security will be discharged upon the Bidder furnishing the performance security, without any interest.**

1.16.8 Bidders that are recurrently registered with the purchaser or registered as MSEs will continue to remain registered during the tender validity period also and are exempted from payment of EMD. In case the tenderer falls in these categories, the bidders should furnish a certified copy of its valid registration details. Except for MSEs, this exemption is valid for the trade group and monetary value of registration only. **The MSEs are provided tender document free of cost and are exempted from the payment of Bid Security provided the goods are produced and the services are rendered by them and not for any trading activities undertaken by them.** Further firms who are having Udyog Aadhar Memorandum are entitled to all benefits available for MSEs under the Public Procurement Policies for MSEs and can get registered with any of the following agencies:

(a)	District Industries Centre
(b)	Khadi and Village Industries Commission
(c)	Khadi and Village Industries Board
(d)	Coir Board
(e)	National Small Industries Corporation
(f)	Directorate of Handicraft and handloom and
(g)	Any other body specified by the Ministry of MSME

1.16.9 Where any aggregator has been appointed by the Ministry of MSME, themselves quote on behalf of some MSE units, such offers will be considered as offer from MSE units and all such facilities would be extended to these aggregators also.

1.16.10 The bid security may be forfeited:

(a)	If a Bidder withdraws or amends or modifies or impairs or derogates its bid during the period of bid validity specified by the Bidder on the Bid Form; or
(b)	In case of a successful Bidder, if the Bidder fails to furnish order acceptance within 14 days of the order or fails to sign the contract and/or fails to furnish Performance Security within 21 days from the date of contract/ order.

1.16.11 Whenever the bidder chooses to submit the Bid Security in the form of Bank Guarantee, then the Bidder should advise the banker issuing the Bank Guarantee to immediately send by Registered Post (A.D.) an unstamped duplicate copy of the Guarantee directly to the Purchaser with a covering letter to compare with the original BG for the correctness, genuineness, etc.

1.17. Period of Validity of Bids

- 1.17.1 Bids shall remain valid for minimum of 90 days after the date of bid opening prescribed by the Purchaser. A bid valid for a shorter period shall be rejected by the Purchaser as non-responsive.
- 1.17.2 In exceptional circumstances, the Purchaser may solicit the Bidder's consent to an extension of the period of validity. The request and the responses thereto shall be made in writing (by post, fax or e-mail). The bid security provided shall also be suitably extended failing which the bid would be summarily ignored. A Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request will not be required nor permitted to modify its bid.
- 1.17.3 Bid evaluation will be based on the bid prices without taking into consideration the above corrections.

1.18. Format and Signing of Bid

- 1.18.1 The bids may be submitted as Single-bid or Two-bid as specified in the Invitation for Bids / NIT.
- 1.18.2 In case the bids are invited on single bid basis, then the Bidder shall submit E-bid comprising all documents listed under clause 1.9 relating to documents comprising the bid.
- 1.18.3 In case the bids are invited on two-bid system, the Bidder shall submit E-bid in two separate parts. First part shall contain Technical bid comprising all documents listed under clause relating to Documents Comprising the Bid excepting bid form and price schedule forms. The second part shall contain the Price-Bid comprising Bid Form and Price Schedule forms.
- 1.18.4 The scanned copies of the E-bid shall be typed or written in indelible ink and shall be signed by the Bidder or a person or persons duly authorized to bind the Bidder to the Contract. **All pages of the bid, except for un-amended printed literature, shall be initialed by the person or persons signing the bid detailing his/her name and contact details.**
- 1.18.4 Any interlineations, erasures or overwriting shall be valid only if they are initialed by the persons or persons signing the bid.

D. Submission and sealing of Bids

1.19. Submission, Sealing and Marking of Bids

- 1.19.1 Bids shall be submitted online only at CPPP website <https://etenders.gov.in> **(Bids received by Manual/ Offline bids/ FAX/E-mail would not be considered for evaluation.)**
- 1.19.2 The Bidder shall download the Tender Enquiry Document directly from the website <https://etenders.gov.in> and shall not tamper/modify it in any manner. In case if the same is found to be tampered/modified in any manner, Tender/Bid will be summarily rejected and EMD would be forfeited.
- 1.19.3 The complete bidding process is online. Bidders should be in possession of valid Digital Signature Certificate (DSC) of class III for online submission of bids. Prior to bidding DSC need to be registered on the website mentioned above. If the envelope is not digitally signed & encrypted the Purchaser shall not accept such open Bids for evaluation purpose and shall be treated as non-responsive and rejected.
- 1.19.4 Bidders are advised to go through “**Bidder Manual Kit**”, “**System Settings**” & “**FAQ**” links available on the login page of the e-Tender portal for guidelines, procedures & system requirements. In case of any technical difficulty, Bidders may contact the help desk numbers & email ids mentioned at the e-tender portal. Every Bidder will be required to obtain a Class-III Digital Signature (DSC) for submission of Bids.
- 1.19.5 Bidders are advised to visit CPPP website <https://etenders.gov.in> regularly to keep themselves updated, for any changes/modifications in the Tender Enquiry Document.
- 1.19.6 Intending bidders are advised to visit CPPP website <https://etenders.gov.in> regularly till closing date of submission of bid, for any corrigendum.

1.19.7 The Bid Security/Earnest Money Deposit shall be deposited through Bank Guarantee / Demand Draft drawn in favour of "The Director, National Aerospace Laboratories, Bengaluru". The original Bid Security/EMD must be delivered at address mentioned in Sr.No.1 of NIT till bid submission date and time as mentioned in "Date Sheet" failing which the bid shall be summarily rejected.

1.19.8 Purchaser shall receive the bids online through CPPP portal only. The e-Tender portal shall automatically stop accepting bids after the scheduled date and time specified in the Tender Document. Partially submitted bids shall be treated as invalid and shall not be processed.

1.20. [Deadline for Submission of Bids](#)

1.20.1 Bidders are advised to upload and submit their E-bids timely within due date for submission of E-Bids in view of the electronic process so as to avoid last minute issues.

1.20.2 The Purchaser may, at its discretion, extend the deadline for submission of bids by amending the bid documents in accordance with Clause relating to Amendment of Bidding Documents in which case all rights and obligations of the Purchaser and Bidders previously subject to the deadline will thereafter be subject to the deadline as extended.

1.21. [Late Submission of EMD](#)

1.21.1 Any bid security/EMD received by the Purchaser after the due date for submission of bids prescribed by the Purchaser is liable to be rejected.

1.21.2 Bidders must note that the e-tender portal shall not permit uploading of bids after the scheduled time of submission.

1.22. [Withdrawal, substitution and Modification of Bids](#)

1.22.1 The bidder may withdraw, correct or modify his digitally signed bid after submission prior to the deadline for submission of bids, through provisions of e-tendering portal.

1.22.2 The bidder is not allowed to modify or withdraw bid after deadline for submission of bids.

[E. Opening and Evaluation of E-Bids](#)

1.23. [Opening of E-Bids by the Purchaser](#)

1.23.1 The E-bids shall be opened online by authorised officials of the Purchaser as per schedule given in Date Sheet.

1.23.2 In the event of the specified date of Bid opening being declared a holiday for the Purchaser, the Bids shall be opened at the appointed time and location on the next working day. In two-part bidding, the financial bid shall be opened only after technical evaluation. No separate intimation shall be sent to the bidders in this regard.

1.23.3 Since, E-bid is an online process; the E-bid opening or any other process may be delayed due to any technical/server issue. If any such issue arises, this will not be tantamount to process delay and CSIR-NAL will not be responsible for the same.

1.23.4 On opening of bids online, accepting the bid will not mean that the firm is technically or financially qualified.

1.24. [Confidentiality](#)

1.24.1 Information relating to the examination, evaluation, comparison, and post qualification of bids, and recommendation of contract award, shall not be disclosed to bidders or any other persons not officially concerned with such process until publication of the Contract Award.

1.24.2 Any effort by a Bidder to influence the Purchaser in the examination, evaluation, comparison, and post qualification of the bids or contract award decisions may result in the rejection of its Bid.

1.25. Clarification of Bids

- 1.25.1 To assist in the examination, evaluation, comparison and post qualification of the bids, the Purchaser may, at its discretion, ask the Bidder for a clarification of its bid. The request for clarification and the response shall be in writing and no change in prices or substance of the bid shall be sought, offered or permitted. However, no negotiation shall be held except with the lowest bidder, at the discretion of the purchaser. Any clarification submitted by a bidder in respect to its bid which is not in response to a request by the purchaser shall not be considered.

1.26. Preliminary Examination

- 1.26.1 The Purchaser shall examine the bids to confirm that all documents and technical documentation requested in ITB Clause 1.10 have been provided, and to determine the completeness of each document submitted.
- 1.26.2 The Purchaser shall confirm that the following documents and information have been provided in the Bid. If any of these documents or information is missing, the offer shall be rejected.

(a)	Bid Form and Price Schedule, in accordance with ITB Clause 1.10;
(b)	All the tenders received will first be scrutinized to see whether the tenders meet the basic requirements as incorporated in the tender enquiry document. The tenders, who do not meet the basic requirements, are to be treated as unresponsive and ignored. The following are some of the important points, for which a tender may be declared as unresponsive and to be ignored, during the initial scrutiny:
(i)	The Bid is unsigned
(ii)	The Bidder is not eligible.
(iii)	The Bid validity is shorter than the required period.
(iv)	The Bidder has quoted for goods manufactured by a different firm without the required authority letter from the proposed manufacturer.
(v)	Bidder has not agreed to give the required performance security or has not furnished the bid security.
(vi)	The goods quoted are sub-standard, not meeting the required specification, etc.
(vii)	Against the schedule of Requirement (incorporated in the tender enquiry), the bidder has not quoted for the entire requirement as specified in that schedule.
(viii)	The bidder has not agreed to some essential condition(s) incorporated in the tender enquiry.

1.27 Bidder's right to question rejection.

- 1.27.1 A Bidder shall have the right to be heard in case Bidder feels that a proper procurement process is not being followed and/or tender has been rejected wrongly. Only a directly affected bidder can represent in this regard as under:

i)	Only a bidder who has participated in the concerned procurement process i.e. pre-qualification, bidder registration or bidding, as the case may be, can make such representation;
ii)	In case pre-qualification bid has been evaluated before the bidding of Technical bids, an application for review in relation to the technical bid may be filed only by a bidder who has qualified in pre-qualification bid;
iii)	In case technical bid has been evaluated before the opening of the financial bid, an application for review in relation to the financial bid may be filed only by a bidder whose technical bid is found to be acceptable.
iv)	Following decisions of the purchaser in accordance with the provision of internal guidelines shall not be subject to review:
a)	Determination of the need for procurement;
b)	Selection of the mode of procurement or bidding system;
c)	Choice of selection procedure;
d)	Provisions limiting participation of bidders in the procurement process;
e)	The decision to enter into negotiations with the L1 bidder;
f)	Cancellation of the procurement process except where it is intended to subsequently re-tender the same requirements;

g)	Issues related to ambiguity in contract terms may not be taken up after a contract has been signed, all such issues should be highlighted before consummation of the contract by the vendor/contractor; and
h)	Complaints against specifications except under the premise that they are either vague or too specific so as to limit competition may be permissible.

- 1.27.2 In case a Bidder feels aggrieved by the decision of the purchaser, the Bidder may then send their representation in writing to the Purchaser's address as indicated in Special Conditions of Contract (SCC) **within 05 working days** from the date of communication of the purchaser intimating the rejection for reconsideration of the decision by the purchaser.

1.28 Responsiveness of Bids

- 1.28.1 Prior to the detailed evaluation, the purchaser will determine the substantial responsiveness of each bid to the bidding documents. For purposes of this clause, a substantive responsive bid is one, which conforms to all terms and condition of the bidding documents without material deviations, reservations or omissions. A material deviation, reservation or omission is one that:

(a)	Affects in any substantial way the scope, quality, or performance of the Goods and Related Services specified in the Contract; or
(b)	Limits in any substantial way, inconsistent with the Bidding Documents, the Purchaser's rights or the Bidder's obligations under the Contract; or
(c)	If rectified, would unfairly affect the competitive position of other bidders presenting substantially responsive bids.

- 1.28.2 The purchasers' determination of a bid's responsiveness is to be based on the contents of the bid itself without recourse to extrinsic evidence.
- 1.28.3 If a bid is not substantially responsive, it will be rejected by the Purchaser and may not subsequently be made responsive by the Bidder by correction of the material deviation, reservation or omission.
- 1.28.4 If a bidder quotes Nil Charges/consideration, the bid shall be treated as unresponsive and will not be considered.

1.29 Non-Conformity, Error and Omission

- 1.29.1 Provided that a Bid is substantially responsive, the Purchaser may waive any nonconformities or omissions in the Bid that do not constitute a material deviation.
- 1.29.2 Provided that a bid is substantially responsive, the Purchaser may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities or omissions in the bid related to documentation requirements. Such omission shall not be related to any aspect of the price of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.
- 1.29.3 Provided that the Bid is substantially responsive, the Purchaser shall correct arithmetical errors on the following basis:

(a)	if there is a discrepancy between the unit price and the line item total that is obtained by multiplying the unit price by the quantity, the unit price shall prevail and the line item total shall be corrected, unless in the opinion of the Purchaser there is an obvious misplacement of the decimal point in the unit price, in which case the line item total as quoted shall govern and the unit price shall be corrected;
(b)	if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and
(c)	if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above.

- 1.29.4 Provided that a bid is substantially responsive, the purchaser may request that a bidder may confirm the correctness of arithmetic errors as done by the purchaser within a target date. In case, no reply is received then the bid submitted shall be ignored and its Bid Security may be forfeited.

1.30 Examination of Terms & Conditions, Technical Evaluation

- 1.30.1 The Purchaser shall examine the Bid to confirm that all terms and conditions specified in the GCC and the SCC have been accepted by the Bidder without any material deviation or reservation.
- 1.30.2 The Purchaser shall evaluate the technical aspects of the Bid submitted in accordance with ITB Clause 1.15, to confirm that all requirements specified in Schedule of Requirements of the Bidding Documents have been met without any material deviation or reservation.
- 1.30.3 If, after the examination of the terms and conditions and the technical evaluation, the Purchaser determines that the Bid is not substantially responsive in accordance with ITB Clause 1.28, it shall reject the Bid.

1.31 Conversion to Single Currency

- 1.31.1 To facilitate evaluation and comparison, the Purchaser will convert all quoted prices expressed in various currencies to Indian Rupees at the selling exchange rate established by any bank in India as notified in the Newspapers on the date of bid opening (techno-commercial bid in the case of two-part bidding) For this purpose, exchange rate notified in **www.xe.com or www.rbi.org** or any other website could also be used by the purchaser.

1.32 Evaluation and comparison of bids

- 1.32.1 The Purchaser shall evaluate each bid that has been determined, up to this stage of the evaluation, to be substantially responsive.
- 1.32.2 To evaluate a Bid, the Purchaser shall only use all the factors, methodologies and criteria defined below. No other criteria or methodology shall be permitted.
- 1.32.3 Purchase preference shall be given to all local suppliers in all procurements undertaken by the purchaser in the following manner:

(a)	Where the purchaser has restricted the eligibility of suppliers to Indian suppliers only, as per para 08 of the invitation to bid/NIT. This is applicable only for those items for which the Nodal Ministry has communicated that there is sufficient local capacity and local competition for the cost of procurement up to Rs. 50.00 lakhs.				
(b)	If the tendered items are not listed by the Nodal Ministry indicating the local capacity and local competition, the following procedure of evaluation shall be followed, irrespective of value: <table><tr><td>(i)</td><td>Among all qualified bids, the lowest bid will be termed as L1. If L1 is from a local supplier, the contract for full quantity will be awarded to L1.</td></tr><tr><td>(ii)</td><td>If L1 bid is not from a local supplier, 50% of the order quantity shall be awarded to L1. Thereafter, the lowest bidder among the local suppliers, will be invited to match the L1 price for the remaining 50% quantity, subject to the local supplier's quoted price which should fall within the margin of purchase preference of 20%. The contract for that quantity shall be awarded to such local supplier, who matches the L1 price. In case such lowest eligible local supplier fails to match the L1 price or accepts less than the offered quantity, the next higher local supplier within the margin of purchase preference shall be invited to match the L1 price for the remaining quantity and so on. The contract shall be awarded accordingly. In case some quantity is still left uncovered on the part of local suppliers, the balance quantity may also be ordered to the L1 bidder.</td></tr></table>	(i)	Among all qualified bids, the lowest bid will be termed as L1. If L1 is from a local supplier, the contract for full quantity will be awarded to L1.	(ii)	If L1 bid is not from a local supplier, 50% of the order quantity shall be awarded to L1. Thereafter, the lowest bidder among the local suppliers, will be invited to match the L1 price for the remaining 50% quantity, subject to the local supplier's quoted price which should fall within the margin of purchase preference of 20%. The contract for that quantity shall be awarded to such local supplier, who matches the L1 price. In case such lowest eligible local supplier fails to match the L1 price or accepts less than the offered quantity, the next higher local supplier within the margin of purchase preference shall be invited to match the L1 price for the remaining quantity and so on. The contract shall be awarded accordingly. In case some quantity is still left uncovered on the part of local suppliers, the balance quantity may also be ordered to the L1 bidder.
(i)	Among all qualified bids, the lowest bid will be termed as L1. If L1 is from a local supplier, the contract for full quantity will be awarded to L1.				
(ii)	If L1 bid is not from a local supplier, 50% of the order quantity shall be awarded to L1. Thereafter, the lowest bidder among the local suppliers, will be invited to match the L1 price for the remaining 50% quantity, subject to the local supplier's quoted price which should fall within the margin of purchase preference of 20%. The contract for that quantity shall be awarded to such local supplier, who matches the L1 price. In case such lowest eligible local supplier fails to match the L1 price or accepts less than the offered quantity, the next higher local supplier within the margin of purchase preference shall be invited to match the L1 price for the remaining quantity and so on. The contract shall be awarded accordingly. In case some quantity is still left uncovered on the part of local suppliers, the balance quantity may also be ordered to the L1 bidder.				
(c)	If the tendered item is not divisible, the following procedure of evaluation shall be followed: <table><tr><td>(i)</td><td>Among all qualified bids, the lowest bid will be termed as L1. If L1 is from a local supplier, the contract will be awarded to L1.</td></tr><tr><td>(ii)</td><td>If L1 is not from a local supplier, the lowest bidder among the local suppliers will be invited to match the L1 price, subject to local supplier's quoted price falling within the margin of purchase preference of 20%. Accordingly, the contract shall be awarded to the local supplier matching the L1 price.</td></tr></table>	(i)	Among all qualified bids, the lowest bid will be termed as L1. If L1 is from a local supplier, the contract will be awarded to L1.	(ii)	If L1 is not from a local supplier, the lowest bidder among the local suppliers will be invited to match the L1 price, subject to local supplier's quoted price falling within the margin of purchase preference of 20%. Accordingly, the contract shall be awarded to the local supplier matching the L1 price.
(i)	Among all qualified bids, the lowest bid will be termed as L1. If L1 is from a local supplier, the contract will be awarded to L1.				
(ii)	If L1 is not from a local supplier, the lowest bidder among the local suppliers will be invited to match the L1 price, subject to local supplier's quoted price falling within the margin of purchase preference of 20%. Accordingly, the contract shall be awarded to the local supplier matching the L1 price.				

	(iii)	In case such lowest eligible local supplier fails to match the L1 price, the local supplier with the next higher bid within the margin of purchase preference shall be invited to match the L1 price. This may be repeated until all the local suppliers are given an opportunity to match the L1 price. The contract shall be awarded accordingly. In case none of the local suppliers within the margin of purchase preference match the L1 price, the contract may be awarded to the L1 bidder.
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1.32.4 Further, in tender, where the items are divisible, the participating Micro and Small Enterprises (MSE) quoting price within price band of L1+15 (fifteen) per cent shall also be allowed to supply a portion of requirement by bringing down their price to L1 price in a situation where L1 price is from someone other than a MSE and such MSE shall be allowed to supply up to 25 (twenty-five) per cent of total tendered value. The 25 (twenty-five) per cent quantity is to be distributed proportionately among these bidders, in case there are more than one MSMEs within such price band.

1.32.5 Within this 25% (Twenty-five Percent) quantity, a purchase preference of 25 (twenty-five) per cent out of 25 (twenty-five) per cent is reserved for MSEs owned by Scheduled Caste (SC)/Scheduled Tribe (ST) entrepreneurs (if they participate in the tender process and match the L1 price). Further, out of the total annual procurement from the MSEs, (3%) three percent from within the 25% target shall be earmarked for procurement from MSEs owned by women. Provided that, in the event of failure of such SC/ST MSE to participate in tender process or meet tender requirements and L1 price, four per cent sub-target shall be met from other MSE.

1.32.6 In case the items are not divisible, then the MSE quoting price within price band L1 + 15% may be awarded for full/complete supply of total tendered quantity to MSE, considering the spirit of the policy for enhancing the Government procurement from MSEs.

1.32.7 The bids shall be evaluated on the basis of final landing cost which shall be arrived as under:

(a) For Goods manufactured in India

i)	The price of the goods quoted ex-works including all taxes already paid.
ii)	GST and other taxes, if any which will be payable on the goods if the contract is awarded.
iii)	Charges for inland transportation, insurance and other local services required for delivering the goods at the desired destination.
iv)	Wherever applicable, the cost towards the installation, commissioning, spares, extended warranty, AMC/CMC, site preparation and training including any incidental services, if any.

(b) For Goods manufactured abroad

i)	The price of the goods, quoted on FCA (named place of delivery abroad) or FOB (named port of shipment), as specified in the bidding document.
ii)	The charges for insurance and transportation of the goods to the port/place of destination.
iii)	The agency commission etc., if any.
iv)	Wherever applicable, the cost towards the installation, commissioning, spares, extended warranty, AMC/CMC, site preparation and training including any incidental services, if any.

1.32.8 The comparison between the indigenous and the foreign offers shall be made on FOR destination basis and CIF/CIP basis respectively. However, the CIF/CIP prices quoted by any foreign bidder shall be loaded further as under:

(a)	Towards customs duty and other statutory levies—as per applicable rates.
(b)	Towards custom clearance, inland transportation etc. - 2% of the CIF/CIP value.

The bidder should give a clear cut breakup of EXW, FOB/FCA, CIF/CIP prices to facilitate proper comparison with the purchaser reserving the right to order on either basis, failing which the bid would be summarily ignored.

1.32.9 Orders for imported stores need not necessarily be on FOB/FCA basis rather it can be on the basis of any of the incoterm specified in ICC Incoterms 2010 as may be amended from time to time by the ICC or any other designated authority and favourable to the purchaser.

1.32.10 Wherever the price quoted on FOB/FCA and CIF/CIP basis are the same, the Contract would be made on CIF / CIP basis only.

1.32.11 The GCC and the SCC shall specify the mode of transport i.e., whether by Air/Sea/Road/Rail.

1.32.12 There is no provision to purchase optional items. The specifications embodied in the tender documents would be the basis of evaluating the responsiveness of bids received.

1.32.13 The Purchaser shall compare all substantially responsive bids to determine the lowest valued bid, in accordance with ITB Clause 1.32.

1.32.14 Where there is no mention of packing, forwarding, freight, insurance charges, taxes etc. such offers shall be rejected as incomplete.

1.33 Contacting the Purchaser

1.33.1 Subject to ITB Clause 1.25, no Bidder shall contact the Purchaser on any matter relating to its bid, from the time of the bid opening to the time the Contract is awarded.

1.33.2 Any effort by a Bidder to influence the Purchaser in its decisions on bid evaluation, bid comparison or contract award may result in rejection of the Bidder's bid.

1.34 Post qualification

1.34.1 In the absence of pre-qualification, the Purchaser will determine to its satisfaction whether the Bidder that is selected as having submitted the lowest evaluated responsive bid is qualified to perform the contract satisfactorily, in accordance with the criteria listed in ITB Clause 1.14.

1.34.2 The determination will take into account the eligibility criteria listed in the bidding documents and will be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, as well as such other information as the Purchaser deems necessary and appropriate.

1.34.3 An affirmative determination will be a prerequisite for award of the contract to the Bidder. A negative determination will result in rejection of the Bidder's bid.

E. AWARD OF CONTRACT

1.35 Negotiations

1.35.1 Normally, there shall not be any negotiation. Negotiations, if at all, shall be an exception and only in the case of items with limited source of supply. Negotiations shall be held with the lowest evaluated responsive bidder. Counter offers tantamount to negotiations and shall be treated at par with negotiations in the case of one time purchases.

1.36 Award Criteria

1.36.1 Subject to ITB Clause 1.39, the Purchaser will award the contract to the successful Bidder whose bid has been determined to be substantially responsive and has been determined to be the lowest evaluated bid, provided further that the Bidder is determined to be qualified to perform the contract satisfactorily. The details of the award would be hosted on the website of the Purchaser and CPPP website <https://etenders.gov.in>.

1.37 Purchaser's right to vary Quantities at Time of Award

1.37.1 The Purchaser reserves the right at the time of Contract award to increase or decrease the quantity of goods and services originally specified in the Schedule of Requirements to the extent of 25% without any change in unit price or other terms and conditions.

1.38 Option Clause

- 1.38.1 The Purchaser reserves the right to increase or decrease the quantity of the required goods up to 25% (Twenty-Five) per cent at any time, till final delivery date (or the extended delivery date of the contract), by giving reasonable notice even though the quantity ordered initially has been supplied in full before the last date of the delivery period (or the extended delivery period)

1.39 Purchaser's right to accept Any Bid and to reject any or All Bids

- 1.39.1 The Purchaser reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to award of Contract, without thereby incurring any liability to the affected Bidder or Bidders.

1.40 Notification of Award

- 1.40.1 **Prior to the expiration of the period of bid validity**, the Purchaser will notify the successful bidder in writing by registered letter or by cable or telex or fax or e mail that the bid has been accepted and a separate purchase order shall follow through post.
- 1.40.2 Until a formal contract is prepared and executed, the notification of award should constitute a binding contract.
- 1.40.3 Upon the successful Bidder's **furnishing of the signed Contract Form** and performance security pursuant to ITB Clause 1.43, the Purchaser will promptly notify each unsuccessful Bidder and will discharge its bid security.

1.41 Signing of Contract

- 1.41.1 Promptly after notification, the Purchaser shall send the successful Bidder the Agreement/Purchase Order.
- 1.41.2 Within twenty-one (21) days of date of the Purchase Order, the successful Bidder shall sign, date, and return it to the Purchaser.

1.42 Order Acceptance

- 1.42.1 The successful bidder should submit Order acceptance within 14 days from the date of issue of order/signing of contract, failing which it shall be presumed that the Bidder is not interested and the bid security is liable to be forfeited pursuant to clause 1.16.9 of ITB.
- 1.42.2 The order confirmation must be received within 14 days. However, the Purchaser has the powers to extend the time frame for submission of order confirmation beyond the original date. Even after extension of time, if the order confirmation is not received, the contract is liable to be cancelled provided that the purchaser, on being satisfied that it is not a case of cartelization and the integrity of the procurement process has been maintained, may, for cogent reasons, offer the next successful bidder an opportunity to match the financial bid of the first successful bidder, and if the offer is accepted, award the contract to the next successful bidder at the price bid of the first successful bidder.

1.43 Performance Security

- 1.43.1 Within 21 days of receipt of the notification of award/PO, the Supplier shall furnish performance security (PS) in the amount specified in SCC, valid till 60 days after the warranty period.
- 1.43.2 The proceeds of the performance security shall be payable to the Purchaser as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract.
- 1.43.3 The Performance Security shall be denominated in Indian Rupees for the offers received for supplies within India and denominated in the currency of the contract in the case of offers received for supply from foreign countries or in equivalent Indian rupees in case the performance security is submitted by the Indian Agent.

1.43.4 In the case of imports, the PS may be submitted either by the principal or by the Indian agent and, in the case of purchases from indigenous sources, the PS may be submitted by either the manufacturer or their authorized dealer/bidder.

1.43.5 The Performance security shall be in one of the following forms:

(a)	A Bank guarantee or stand-by Letter of Credit issued by a Nationalized/ Scheduled bank located in India or a Foreign bank with its operating branch in India in the form provided in the bidding documents or
(b)	A Banker's cheque or Account Payee demand draft in favour of the purchaser issued by any Nationalized/ Scheduled bank or
(c)	A Fixed Deposit Receipt pledged in favour of the Director, CSIR-NAL, Bengaluru.

1.43.6 The performance security will be discharged by the Purchaser and returned to the Supplier not later than 60 days following the date of completion of the Supplier's performance obligations, including any warranty obligations, unless specified otherwise in SCC, without levy of any interest.

1.43.7 In the event of any contract amendment, the supplier shall, within 21 days of receipt of such amendment, furnish the amendment to the performance security, rendering the same valid for the duration of the contract, as amended for further period of 60 days thereafter.

1.43.8 The performance security must be received within 21 days. However, the Purchaser has the powers to extend the time frame for submission of Performance Security (PS). Even after extension of time, if the PS is not received, the contract is liable to be cancelled provided that the purchaser, on being satisfied that it is not a case of cartelization and the integrity of the procurement process has been maintained, may, for cogent reasons, offer the next successful bidder an opportunity to match the financial bid of the first successful bidder, and if the offer is accepted, award the contract to the next successful bidder at the price bid of the first successful bidder.

1.43.9 Whenever, the bidder chooses to submit the Performance Security in the form of Bank Guarantee, then the Bidder should advise the banker issuing the Bank Guarantee to immediately send by Registered Post (A.D.) an unstamped duplicate copy of the Guarantee directly to the Purchaser with a covering letter to compare with the original BG for the correctness, genuineness, etc.

1.44. [Pre-bid Conference \(PBC\)](#)

1.44.1 A Pre-bid Conference shall be held as indicated in invitation to bid, if any. All prospective bidders are requested to kindly attend the Pre-bid Conference. In order to facilitate the purchaser the proper conduct of the Pre-bid Conference, all prospective bidders are requested to kindly submit their queries (with envelope bearing Tender No. and Date on top and marked "Queries for Pre-bid Conference") so as to reach the purchaser as indicated in invitation to bid. The purchaser shall answer the queries during the pre-bid conference, which would become a part of the proceedings of the Pre-bid Conference. The proceeding of the Pre Bid Conference would be hosted on the website of the purchaser. Before formulating and submitting their bids, all prospective bidders are advised to surf through the purchaser's website after the Pre-bid Conference, in order to enable them take cognizance of the revised tender conditions.

1.45 [Integrity Pact](#)

1.45.1 Integrity Pact binds both buyers and sellers to ethical conduct and transparency in all activities from pre-selection of bidders, bidding and contracting, implementation, completion and operation related to the contract.

1.45.2 The Integrity pact essentially envisages an agreement between the prospective vendors/bidders and the buyer, committing the persons/officials of both sides, not to resort to any corrupt practices in any aspect/stage of the contract. Only those vendors/bidders, who commit themselves to such a Pact with the buyer, would be considered competent to participate in the bidding process. In other words, entering into this Pact would be a preliminary qualification. The essential ingredients of the Pact include:

(i)	Promise on the part of the Purchaser to treat all bidders with equity and reason and not to seek or accept any benefit, which is not legally available;
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(ii)	Promise on the part of bidders not to offer any benefit to the employees of the Purchaser not available legally and also not to commit any offence under Prevention of Corruption Act, 1988 or Indian Penal Code 1860;
(iii)	Promise on the part of bidders not to enter into any undisclosed agreement or understanding with other bidders with respect to prices, specifications, certifications, subsidiary contracts; etc.
(iv)	Undertaking (as part of Fall Clause) by the bidders that they have not and will not sell the same material/equipment at prices lower than the bid price;
(v)	Foreign bidders to disclose the name and address of agents and representatives in India and Indian Bidders to disclose their foreign principals or associates;
(vi)	Bidders to disclose the payments to be made by them to agents/brokers or any other intermediary;
(vii)	Bidders to disclose any past transgressions committed over the specified period with any other company in India or Abroad that may impinge on the anti-corruption principle;
(viii)	Integrity Pact lays down the punitive actions for any violation.

1.45.3 Each page of such Integrity pact proforma would be duly signed by Purchaser's competent signatory. All pages of the Integrity Pact are to be returned by the bidder (along with the technical bid) duly signed by the same signatory who signed the bid, i.e. who is duly authorized to sign the bid and to make binding commitments on behalf of his company. Any bid not accompanied by Integrity Pact duly signed by the bidder shall be considered to be a non-responsive bid and shall be rejected straightway.

1.45.4 The SCC shall specify whether there is a need to enter into a separate Integrity pact or not.

1.45.5 The Integrity Pact would be effective from the date of invitation of bids till complete execution of the contract.

1.45.6 The names and contact details of the Independent External Monitors (IEM) on the event of the need of IP is as detailed in the SCC.

1.45.7 The modal format of IP is at Chapter-7.

1.45.8 As a first option, dispute resolution is available through panel of IEMs' apart from arbitration clause. However, the fees / exemptions on the said account shall be equally shared by the parties.

1.46 Assistance to Bidders:

1.46.1 Any queries relating to the Tender Enquiry Document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contact person indicated in the NIT.

1.46.2 Any queries relating to the process of online bid submission or queries relating to CPP Portal in general may be directed to the 24x7 CPP Portal Helpdesk.

CHAPTER 2
CONDITIONS OF CONTRACT
A GENERAL CONDITIONS OF CONTRACT (GCC)

Clause No.	Contents
2.1	Definitions
2.2	Contract Documents
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2.4	Joint Venture, Consortium or Association
2.5	Scope of Supply
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2.7	Contract price
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2.15	Packing
2.16	Delivery and Documents
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2.41	Risk Purchase Clause
2.42	Option Clause
2.43	Integrity Pact
2.44	Order Acceptance

Note: The General Conditions of Contract shall form the part of Purchase Order / Contract.

GENERAL CONDITIONS OF CONTRACT (GCC)

2.1 Definitions

2.1.1 The following words and expressions shall have the meanings hereby assigned to them:

Sr. No.	Words / Expressions	Meaning
(a)	Contract	The Contract Agreement entered into between the Purchaser and the Supplier, together with the Contract Documents referred to therein, including all attachments, appendices, and all documents incorporated by reference therein.
(b)	Contract Documents	The documents listed in the Contract Agreement, including any amendments thereto.
(c)	Contract Price	The price payable to the Bidder as specified in the Contract Agreement, subject to such additions and adjustments thereto or deductions there from, as may be made pursuant to the Contract.
(d)	Day	Calendar day
(e)	Completion	The fulfilment of the Related Services by the Supplier in accordance with the terms and conditions set forth in the Contract.
(f)	GCC	The General Conditions of Contract.
(g)	Goods	All of the commodities, raw material, machinery and equipment, and/or other materials that the Supplier is required to supply to the Purchaser under the Contract
(h)	Services	The services incidental to the supply of the goods, such as transportation, insurance, installation, training and initial maintenance and other such obligations of the Supplier under the Contract.
(i)	SCC	The Special Conditions of Contract.
(j)	Subcontractor	Any natural person, private or government entity, or a combination of the above, to which any part of the Goods to be supplied or execution of any part of the Related Services is subcontracted by the Supplier.
(k)	Bidder	The natural Person, Private or Government entity, or a combination of the above, whose bid to perform the Contract has been accepted by the Purchaser and is named as such in the Contract Agreement.
(l)	Council	The Council of Scientific & Industrial Research (CSIR), registered under the Societies Registration Act, 1860 of the Government of India having its registered office at 2, Rafi Marg, New Delhi-110001, India.
(m)	Purchaser	Any of the constituent Laboratory/Institute of the Council situated at any designated place in India as specified in SCC
(n)	The final destination	The place named in the SCC.

2.2 Contract Documents

2.2.1 Subject to the order of precedence set forth in the Contract Agreement, all documents forming the Contract (and all parts thereof) are intended to be correlative, complementary, and mutually explanatory. The Contract Agreement shall be read as a whole.

2.3 Code of Integrity

2.3.1 Without prejudice to and in addition to the rights of the Purchaser to other penal provisions as per the bid documents or contract, if the Purchaser comes to a conclusion that a (prospective) bidder/supplier, directly or through an agent, has violated this code of integrity in competing for the contract or in executing a contract, the Purchaser may take appropriate measures including one or more of the following:

a)	Cancellation of the relevant contract and recovery of compensation for loss incurred by the purchaser;
b)	Forfeiture or encashment of any other security or bond relating to the procurement;
c)	Recovery of payments including advance payments, if any, made by the Purchaser along with interest thereon at the prevailing rate.

d)	Provisions in addition to above:	
	1)	Removal from the list of registered suppliers and banning/debarment of the bidder from participation in future procurements of the purchaser for a period not less than one year;
	2)	In case of anti-competitive practices, information for further processing may be filed under a signature of the Joint Secretary level officer, with the Competition Commission of India;
	3)	Initiation of suitable disciplinary or criminal proceedings against any individual or staff found responsible

2.4 [Joint Venture, Consortium or Association](#)

- 2.4.1 If the Supplier is a joint venture, consortium, or association, all of the parties shall be jointly and severally liable to the Purchaser for the fulfilment of the provisions of the Contract and shall designate one party to act as a leader with authority to bind the joint venture, consortium, or association. The composition or the constitution of the joint venture, consortium, or association shall not be altered without the prior consent of the Purchaser.

2.5 [Scope of Supply](#)

- 2.5.1 The Goods and Related Services to be supplied shall be as specified in Chapter 4 i.e. Specifications and allied technical details.

2.6 [Suppliers' Responsibilities](#)

- 2.6.1 The Supplier shall supply all the Goods and Related Services included in the Scope of Supply in accordance with Scope of Supply Clause of the GCC, and the Delivery and Completion Schedule, as per GCC Clause relating to delivery and document.

2.7 [Contract price](#)

- 2.7.1 Prices charged by the Supplier for the Goods supplied and the Related Services performed under the Contract shall not vary from the prices quoted by the Supplier in its bid.

2.8 [Copy Right](#)

- 2.8.1 The copyright in all drawings, documents, and other materials containing data and information furnished to the Purchaser by the Supplier herein shall remain vested in the Supplier, or, if they are furnished to the Purchaser directly or through the Supplier by any third party, including suppliers of materials, the copyright in such materials shall remain vested in such third party.

2.9 [Application](#)

- 2.9.1 These General Conditions shall apply to the extent that they are not superseded by provisions in other parts of the Contract.

2.10 [Standards](#)

- 2.10.1 The Goods supplied and services rendered under this Contract shall conform to the standards mentioned in the Technical Specifications, and, when no applicable standard is mentioned, to the authoritative standard appropriate to the Goods' country of origin and such standards shall be the latest issued by the concerned institution.

2.11 [Use of Contract Documents and Information](#)

- 2.11.1 The Supplier shall not, without the Purchaser's prior written consent, disclose the Contract, or any provision thereof, or any specification, plan, drawing, pattern, sample or information furnished by or

on behalf of the Purchaser in connection therewith, to any person other than a person employed by the Supplier in performance of the Contract. Disclosure to any such employed person shall be made in confidence and shall extend only so far, as may be necessary for purposes of such performance.

2.11.2 The Supplier shall not, without the Purchaser's prior written consent, make use of any document or information enumerated above except for purposes of performing the Contract.

2.11.3 Any document, other than the Contract itself, enumerated above shall remain the property of the Purchaser and shall be returned (in all copies) to the Purchaser on completion of the Supplier's performance under the Contract if so required by the Purchaser.

2.12 Patent Indemnity

2.12.1 The Supplier shall, subject to the Purchaser's compliance with GCC Sub-Clause 2.12.2 Indemnify and hold harmless the Purchaser and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of any nature, including attorney's fees and expenses, which the Purchaser may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright, or other intellectual property right registered or otherwise existing at the date of the Contract by reason of:

(a)	the installation of the Goods by the Supplier or the use of the Goods in India; and
(b)	the sale in any country of the products produced by the Goods

2.12.2 If any proceedings are brought or any claim is made against the Purchaser, the Purchaser shall promptly give the Supplier a notice thereof, and the Supplier may at its own expense and in the Purchaser's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim.

2.13 Performance Security

2.13.1 Within 21 days of receipt of the notification of award/PO, the Supplier shall furnish performance security in the amount specified in SCC, valid till 60 days after the warranty period.

2.13.2 The proceeds of the performance security shall be payable to the Purchaser as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract.

2.13.3 The Performance Security shall be denominated in Indian Rupees for the offers received for supplies within India and denominated in the currency of the contract in the case of offers received for supply from foreign countries or in equivalent Indian Rupees in case the Performance Security is submitted by the Indian Agent.

2.13.4 In the case of imports, the PS may be submitted either by the principal or by the Indian agent and, in the case of purchases from indigenous sources, the PS may be submitted by either the manufacturer or their authorized dealer/bidder.

2.13.5 The Performance security shall be in one of the following forms:

(a)	A Bank guarantee or stand-by Letter of Credit issued by a Nationalized/ Scheduled bank located in India or a Foreign bank with its operating branch in India in the form provided in the bidding documents or
(b)	A Banker's cheque or Account Payee demand draft in favour of the purchaser issued by any Nationalized/ Scheduled bank or
©	A Fixed Deposit Receipt pledged in favour of the Director, CSIR-NAL, Bengaluru.

2.13.6 The performance security will be discharged by the Purchaser and returned to the Supplier not later than 60 days following the date of completion of the Supplier's performance obligations, including any warranty obligations, unless specified otherwise in SCC, without levy of any interest.

- 2.13.7 In the event of any contract amendment, the supplier shall, within 21 days of receipt of such amendment, furnish the amendment to the performance security, rendering the same valid for the duration of the contract, as amended for further period of 60 days thereafter.
- 2.13.8 The order confirmation must be received within 14 days. However, the Purchaser has the powers to extend the time frame for submission of order confirmation and submission of Performance Security (PS). Even after extension of time, if the order confirmation /PS are not received, the contract shall be cancelled provided that the purchaser, on being satisfied that it is not a case of cartelization and the integrity of the procurement process has been maintained, may, for cogent reasons, offer the next successful bidder an opportunity to match the financial bid of the first successful bidder, and if the offer is accepted, award the contract to the next successful bidder at the price bid of the first successful bidder.
- 2.13.9 Whenever, the bidder chooses to submit the Performance Security in the form of Bank Guarantee, then Bidder should advise the banker issuing the Bank Guarantee to immediately send by Registered Post (A.D.) an unstamped duplicate copy of the Guarantee directly to the Purchaser with a covering letter to compare with the original BG for the correctness, genuineness, etc.

2.14 Inspections and Tests

- 2.14.1 The inspections & test, training required would be as detailed in Chapter-4 of the Bidding Document relating to Specification and Allied Technical details.

2.15 Packing

- 2.15.1 The Supplier shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination as indicated in the Contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the Goods' final destination and the absence of heavy handling facilities at all points in transit.
- 2.15.2 The packing, marking and documentation within and outside the packages shall comply strictly with such special requirements as shall be provided for in the Contract including additional requirements are as given below or /and as specified in SCC and in any subsequent instructions ordered by the Purchaser:

The marking and documentation within and outside the packages shall be:

(a)	Each package should have a packing list within it detailing the part No(s), description, quantity etc.
(b)	Outside each package, the contract No., the name and address of the purchaser and the final destination should be indicated on all sides and top.
(c)	Each package should be marked as 1/x, 2/x, 3/x.....x/x, where "x" is the total No. of packages contained in the consignment
(d)	All the sides and top of each package should carry an Appropriate indication/ label/ stickers indicating the precautions to be taken while handling/storage.

2.16 Delivery and Documents

- 2.16.1 Delivery of the Goods and completion and related services shall be made by the supplier in accordance with the terms specified by the Purchaser in the contract. The details of shipping and/or other documents are given below or/and to be furnished by the supplier are specified in SCC.

Details of Shipping and other Documents to be furnished by the Bidder are :	
A)	For goods manufactured or supplied within India
	Within 24 hours of dispatch, the Supplier shall notify the purchaser the complete details of dispatch and also supply following documents by registered post / speed post and copies thereof by FAX/email
(a)	Two copies of Supplier's Invoice indicating, inter-alia description and specification of the goods, quantity, unit price, total value

(b)	Packing list
(c)	Certificate of country of origin
(d)	Insurance certificate, if required under the contract
(e)	Railway receipt/Consignment note
(f)	Manufacturer's warrantee certificate and in-house inspection certificate, if any
(g)	Inspection certificate issued by purchaser's inspector, if any
(h)	Any other document(s) as and when required in terms of the contract
NOTE:	
1	The nomenclature used for the item description in the invoice(s), packing list(s) and the delivery note(s) etc. should be identical to that used in the contract. The dispatch particulars including the name of the transporter should also be mentioned in the Invoice(s).
2	The above documents should be received by the Purchaser before arrival of the Goods and, if not received, the Bidder will be responsible for any consequent expenses.

B)	For goods manufactured or supplied from abroad
	Within 24 hours of dispatch, the Supplier shall notify the purchaser the complete details of dispatch and also supply following documents by Registered Post / Courier and copies thereof by FAX/Email.
(a)	Two copies of Bidder's Invoice giving full details of the goods including quantity, value, etc.
(b)	Packing list
(c)	Certificate of country of origin
(d)	Manufacturer's guarantee and Inspection certificate, if any
(e)	Inspection certificate issued by the Purchaser's Inspector, if any
(f)	Insurance Certificate, if required under the contract
(g)	Name of the Vessel / Carrier
(h)	Bill of Lading / Airway Bill
(i)	Port of Loading
(j)	Date of Shipment
(k)	Port of Discharge & expected date of arrival of goods
(l)	Any other document(s) as and when required in terms of the contract
NOTE:	
1	The nomenclature used for the item description in the invoice(s), packing list(s) and the delivery note(s) etc. should be identical to that used in the contract. The dispatch particulars including the name of the transporter should also be mentioned in the Invoice(s).
2	The above documents should be received by the Purchaser before arrival of the Goods and, if not received, the Bidder will be responsible for any consequent expenses.
3	The clearing of the consignment at Bengaluru Airport shall be done by our authorized Custom House Agents (CHA). The corresponding shipping documents may be forwarded to them accordingly. It is advised to give us and our CHA, a pre-alert before the consignment is dispatched. If there is delay in clearing of the consignment for <u>not</u> giving timely pre-alert then demurrage (Ware house charges), if applicable has to be refunded to us.

2.16.2 The terms FOB, FCA, CIF, CIP, etc. shall be governed by the rules prescribed in the current edition of the Incoterms published by the International Chambers of Commerce, Paris.

2.16.3 The mode of transportation shall be as specified in SCC. In case the purchaser elects to have the transportation done through Air, then air lifting needs to be done through Air India only. In case Air India does not operate in the Airport of dispatch, then the bidder is free to engage the services of any other Airlines.

2.16.4 High-sea sales delivery-term is not acceptable.

2.17 Insurance

2.17.1 Should the purchaser elect to buy on CIF/CIP basis, the Goods supplied under the Contract shall be fully insured against any loss or damage incidental to manufacture or acquisition, transportation, storage and delivery in the manner specified in SCC.

2.17.2 Where delivery of the goods is required by the purchaser on CIF or CIP basis the supplier shall arrange and pay for Cargo Insurance, naming the purchaser as beneficiary and initiate & pursue claims till settlement, on the event of any loss or damage.

2.17.3 Where delivery is on FOB or FCA basis, insurance would be the responsibility of the purchaser.

2.17.4 With a view to ensure that claims on insurance companies, if any, are lodged in time, the bidders and /or the Indian agent shall be responsible for follow up with their principals for ascertaining the dispatch details and informing the same to the Purchaser and he shall also liaise with the Purchaser to ascertain the arrival of the consignment after clearance so that immediately thereafter in his presence the consignment could be opened and the insurance claim be lodged, if required, without any loss of time. Any delay on the part of the bidder/Indian Agent would be viewed seriously and he shall be directly responsible for any loss sustained by the purchaser on the event of the delay.

2.18 [Transportation](#)

2.18.1 Where the Supplier is required under the Contract to deliver the Goods FOB, transport of the Goods, up to and including the point of putting the Goods on board the vessel at the specified port of loading, shall be arranged and paid for by the Supplier, and the cost thereof shall be included in the Contract price. Where the Supplier is required under the Contract to deliver the Goods FCA, transport of the Goods and delivery into the custody of the carrier at the place named by the Purchaser or other agreed point shall be arranged and paid for by the Supplier, and the cost thereof shall be included in the Contract Price.

2.18.2 Where the Supplier is required under the Contract to deliver the Goods CIF or CIP, transport of the Goods to the port of destination or such other named place of destination in the Purchaser's country, as shall be specified in the Contract, shall be arranged and paid for by the Supplier, and the cost thereof shall be included in the Contract Price.

2.18.3 In the case of supplies from within India, where the Supplier is required under the Contract to transport the Goods to a specified destination in India, defined as the Final Destination, transport to such destination, including insurance and storage, as specified in the Contract, shall be arranged by the Supplier, and the related costs shall be included in the Contract Price.

2.19 [Incidental Services](#)

2.19.1 The supplier may be required to provide any or all of the services, including training, if any, specified in chapter 4.

2.20 [Spare Parts](#)

2.20.1 The Supplier shall be required to provide any or all of the following materials, notifications, and information pertaining to spare parts manufactured or distributed by the Supplier:

(a)	Such spare parts as the Purchaser may elect to purchase from the Supplier, providing that this election shall not relieve the Supplier of any warranty obligations under the Contract; and
(b)	In the event of termination of production of the spare parts:
(i)	Advance notification to the Purchaser of the pending termination, in sufficient time to permit the Purchaser to procure needed requirements; and
(ii)	Following such termination, furnishing at no cost to the Purchaser, the blueprints, drawings and specifications of the spare parts, if requested.

2.21 [Warranty](#)

2.21.1 The Supplier warrants that all the Goods are new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided otherwise in the Contract.

2.21.2 The Supplier further warrants that the Goods shall be free from defects arising from any act or omission of the Supplier or arising from design, materials, and workmanship, under normal use in the conditions prevailing in India.

2.21.3 Unless otherwise specified in the SCC, the warranty shall remain valid for Twelve (12) months after the Goods, or any portion thereof as the case may be, have been delivered to and accepted at the final destination indicated in the SCC, or for Eighteen (18) months after the date of shipment from the port

or place of loading in the country of origin, whichever period concludes earlier.

- 2.21.4 The Purchaser shall give notice to the Supplier stating the nature of any such defects together with all available evidence thereof, promptly following the discovery thereof. The Purchaser shall afford all reasonable opportunity for the Supplier to inspect such defects.
- 2.21.5 Upon receipt of such notice, the Supplier shall, within a reasonable period of time, expeditiously repair or replace the defective Goods or parts thereof, at no cost to the Purchaser.
- 2.21.6 If having been notified, the Supplier fails to remedy the defect within a reasonable period of time; the Purchaser may proceed to take within a reasonable period such remedial action as may be necessary, at the Supplier's risk and expense and without prejudice to any other rights which the Purchaser may have against the Supplier under the Contract.
- 2.21.7 Goods requiring warranty replacements must be replaced on free of cost basis to the purchaser.

2.22 Terms of Payment

- 2.22.1 The method and conditions of payment to be made to the Supplier under this Contract shall be as specified in the SCC.
- 2.22.2 The Supplier's request(s) for payment shall be made to the Purchaser in writing, accompanied by an invoice describing, as appropriate, the Goods delivered and the Services performed, and by documents, submitted pursuant to Delivery and document Clause of the GCC and upon fulfilment of other obligations stipulated in the contract.
- 2.22.3 Payments shall be made promptly by the Purchaser but in no case later than thirty (30) days after submission of the invoice or claim by the Supplier. While claiming the payment, the supplier should certify in the bill/invoice that the payment being claimed strictly in terms of the contract and all obligations on the part of the supplier for claiming the payment have been fulfilled as required under the contract.
- 2.22.4 Payment shall be made in currency as indicated in the contract.

2.23 Change Orders and Contract Amendments

- 2.23.1 The Purchaser may at any time, by written order given to the Supplier pursuant to Clause on Notices of the GCC make changes within the general scope of the Contract in any one or more of the following:

(a)	Increase or decrease in the quantity required, exercise of quantity opinion clause;
(b)	Changes in schedule of deliveries and terms of delivery;
(c)	The changes in inspection arrangements;
(d)	Changes in terms of payments and statutory levies;
(e)	Changes due to any other situation not anticipated;

- 2.23.2 No changes in the price quoted shall be permitted after the purchase order has been issued except on account of statutory variations.
- 2.23.3 No variation or modification in the terms of the contract shall be made except by written amendment signed by the parties.

2.24 Assignment

- 2.24.1 The Supplier shall not assign, in whole or in part, its obligations to perform under the Contract, except with the Purchaser's prior written consent.

2.25 Subcontracts

- 2.25.1 The Supplier shall notify the Purchaser in writing of all subcontracts awarded under this Contract if not already specified in the bid. Such notification, in the original bid or later, shall not relieve the Supplier from any liability or duties or obligation under the contract.

2.26 Extension of time.

- 2.26.1 Delivery of the Goods and performance of the Services shall be made by the Supplier in accordance with the time schedule specified by the Purchaser.
- 2.26.2 If at any time during performance of the Contract, the Supplier or its sub-contractor(s) should encounter conditions impeding timely delivery of the Goods and performance of Services, the Supplier shall promptly notify the Purchaser in writing of the fact of the delay, its likely duration and its cause(s). As soon as practicable after receipt of the Supplier's notice, the Purchaser shall evaluate the situation and may, at its discretion, extend the supplier's time for performance with or without liquidated damages, in which case the extension shall be ratified by the parties by amendment of the Contract.
- 2.26.3 Except as provided under the Force Majeure clause of the GCC, a delay by the Supplier in the performance of its delivery obligations shall render the Supplier liable to the imposition of liquidated damages pursuant to liquidated damages Clause of the GCC unless an extension of time is agreed upon pursuant to above clause without the application of penalty clause.

2.27 Liquidated Damages

- 2.27.1 Subject to GCC Clause on Force Majeure, if the Supplier fails to deliver any or all of the Goods or to perform the Services within the period(s) specified in the Contract, the Purchaser shall, without prejudice to its other remedies under the Contract, deduct from the Contract Price, as penalty, a sum equivalent to the percentage specified in SCC of the delivered price of the delayed Goods or unperformed Services or contract value in case the delivered price of the delayed goods or unperformed services cannot be ascertained from the contract, for each week or part thereof of delay until actual delivery or performance, up to a maximum deduction of the Percentage specified in SCC. Once the maximum is reached, the Purchaser may consider termination of the Contract pursuant to GCC Clause on Termination for Default.

2.28 Termination for Default

- 2.28.1 The Purchaser may, without prejudice to any other remedy for breach of contract, by written notice of default sent to the Supplier, terminate the Contract in whole or part

(a)	If the Supplier fails to deliver any or all of the Goods within the period(s) specified in the contract, or within any extension thereof granted by the Purchaser pursuant to GCC Clause on Extension of Time; or
(b)	If the Supplier fails to perform any other obligation(s) under the Contract.
(c)	If the Supplier, in the judgment of the Purchaser has engaged in corrupt or fraudulent or collusive or coercive practices etc as defined in GCC Clause and ITB clause on code of integrity in competing for or in executing the Contract.

- 2.28.2 In the event the purchaser terminates the contract in whole or in part, he may take recourse to any one or more of the following action:

(a)	The Performance Security is to be forfeited;
(b)	The purchaser may procure, upon such terms and in such manner as it deems appropriate, stores similar to those undelivered, and the supplier shall be liable for all available actions against it in terms of the contract.
(c)	However, the supplier shall continue to perform the contract to the extent not terminated.

2.29 Force Majeure

- 2.29.1 Notwithstanding the provisions of GCC Clauses relating to extension of time, Liquidated damages and Termination for Default the Supplier shall not be liable for forfeiture of its performance security, liquidated damages or termination for default, if and to the extent that, its delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.
- 2.29.2 For purposes of this Clause, "Force Majeure" means an event or situation beyond the control of the Supplier that is not foreseeable, is unavoidable, and its origin is not due to negligence or lack of care on the part of the Supplier. Such events may include, but not be limited to, acts of the Purchaser in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions, and freight embargoes.

2.29.3 If a Force Majeure situation arises, the Supplier shall promptly notify the Purchaser in writing of such conditions and the cause thereof within 21 days of its occurrence. Unless otherwise directed by the Purchaser in writing, the Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.

2.29.4 If the performance in whole or in part or any obligations under the contract is prevented or delayed by any reason of Force Majeure for a period exceeding 60 days, either party may at its option terminate the contract without any financial repercussions on either side.

2.30 [Termination for Insolvency](#)

2.30.1 The Purchaser may at any time terminate the Contract by giving written notice to the Supplier, if the Supplier becomes bankrupt or otherwise insolvent. In this event, termination will be without compensation to the Supplier, provided that such termination will not prejudice or affect any right of action or remedy, which has accrued or will accrue thereafter to the Purchaser.

2.31 [Termination for Convenience](#)

2.31.1 The Purchaser, by written notice sent to the Supplier, may terminate the Contract, in whole or in part, at any time. The notice of termination shall specify that termination is for the Purchaser's convenience, the extent to which performance of the Supplier under the Contract is terminated, and the date upon which such termination becomes effective.

2.31.2 The Goods that are complete and ready for shipment within 30 days after the Supplier's receipt of notice of termination shall be accepted by the Purchaser at the Contract terms and prices. For the remaining Goods, the Purchaser may elect:

(a)	To have any portion completed and delivered at the Contract terms and prices; and/or
(b)	To cancel the remainder and pay to the Supplier an agreed amount for partially completed Goods and for materials and parts previously procured by the Supplier.

2.32 [Settlement of Disputes](#)

2.32.1 The Purchaser and the supplier shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the Contract.

2.32.2 If, after twenty-one (21) days, the parties have failed to resolve their dispute or difference by such mutual consultation, then either the Purchaser or the Supplier may give notice to the other party of its intention to commence arbitration, as hereinafter provided, as to the matter in dispute, and no arbitration in respect of this matter may be commenced unless such notice is given. Any dispute or difference in respect of which a notice of intention to commence arbitration has been given in accordance with this Clause shall be finally settled by arbitration. Arbitration may be commenced prior to or after delivery of the Goods under the Contract.

2.32.3 The dispute settlement mechanism/arbitration proceedings shall be concluded as under:

(a)	If any dispute or difference arises between the parties hereto as to the construction, interpretation, effect and implication of any provision of this agreement including the rights or liabilities or any claim or demand of any party against other or in regard to any other matter under these presents but excluding any matters, decisions or determination of which is expressly provided for in this Agreement, such disputes or differences shall be referred to an Arbitral Bench consisting of three Arbitrators, one each to be appointed by each party and the two Arbitrators shall appoint a third Arbitrator who shall be the presiding Arbitrator. A reference to the Arbitration under this Clause shall be deemed to be submission within the meaning of the Arbitration and Conciliation Act, 1996 and the rules framed thereunder for the time being in force. Each party shall bear and pay its own cost of the arbitration proceedings unless the Arbitrators otherwise decides in the Award.
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(b)	In the case of a dispute between the purchaser and a Foreign Supplier, the dispute shall be settled by arbitration in accordance with provision of sub-clause (a) above. But if this is not acceptable to the supplier then the dispute shall be settled in accordance with provisions of UNCITRAL (United Nations Commission on International Trade Law) Arbitration Rules.
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2.32.4 The venue of the arbitration shall be the place from where the purchase order or contract is issued.

2.32.5 Notwithstanding, any reference to arbitration herein:

(a)	The parties shall continue to perform their respective obligations under the Contract unless they otherwise agree; and
(b)	the Purchaser shall pay the Supplier any monies due the Supplier.

2.33 [Governing Language](#)

2.33.1 The contract shall be written in English language which shall govern its interpretation. All correspondence and other documents pertaining to the Contract, which are exchanged by the parties, shall be written in the English language only.

2.34 [Applicable Law](#)

2.34.1 The Contract shall be interpreted in accordance with the laws of the Union of India and all disputes shall be subject to place of jurisdiction as specified in SCC.

2.35 [Notices](#)

2.35.1 Any notice given by one party to the other pursuant to this contract/order shall be sent to the other party in writing or by cable, telex, FAX, e-mail or and confirmed in writing to the other party's address specified in the SCC.

2.35.2 A notice shall be effective when delivered or on the notice's effective date, whichever is later.

2.36 [Taxes and Duties](#)

2.36.1 For goods manufactured outside India, the Supplier shall be entirely responsible for all taxes, stamp duties, license fees, and other such levies imposed outside India.

2.36.2 For goods Manufactured within India, the Supplier shall be entirely responsible for all taxes, duties, license fees, etc., incurred till its final manufacture/production.

2.36.3 If any tax exemptions, reductions, allowances or privileges may be available to the Supplier in India, the Purchaser shall make its best efforts to enable the Supplier to benefit from any such tax savings to the maximum allowable extent without any commitment.

2.36.4 **All payments due under the contract shall be paid after deduction of statutory levies (at source) (like TDS, IT, TCS etc.) wherever applicable. In this connection Govt notification may be referred to before submitting quote on their own interest. Statutory deductions will be done accordingly at the time of payment.**

2.36.5 **Customs Duty :**

a) If the supply is from abroad this Institute is permitted to import goods as per notification No.51/96 – Customs and pay a concessional duty up to 5% plus surcharges, if any as per notification 24/2002 – Customs on all imports.

b) The Certificate is issued without any commitment by CSIR-NAL. Hence, the supplier should ensure its applicability for their own interest.

2.36.6 GST

(a) The Purchaser is registered with Dept. of Scientific & Industrial Research, Govt. of India and concessional customs duty and GST & IGST are leviable vide notification No. 54/2002-Customs on all imports covered under Notification No.51/96-Customs dated 23.07.1996, Notification No.47/2017-Integrated Tax (Rate) and Notification No. 45/2017-Central Tax (Rate) both dated 14th November, 2017.

(b) The Certificates is issued without any commitment by CSIR-NAL. Hence, the supplier should ensure its applicability for their own interest.

2.37 [Right to use Defective Goods](#)

2.37.1 If after delivery, acceptance and installation and within the guarantee and warranty period, the operation or use of the goods proves to be unsatisfactory, the Purchaser shall have the right to continue to operate or use such goods until rectifications of defects, errors or omissions by repair or by partial or complete replacement is made without interfering with the Purchaser's operation.

2.38 [Protection against Damage](#)

2.38.1 The system shall not be prone to damage during power failures and trip outs. The normal voltage and frequency conditions available at site as under:

(a)	Voltage 230 volts – Single phase/ 415 V 3 phase (+_ 10%)
(b)	Frequency 50 Hz.

2.39 [Site preparation and installation](#)

2.39.1 The Purchaser is solely responsible for the construction of the equipment sites in compliance with the technical and environmental specifications defined by the Supplier. The Purchaser will designate the installation sites before the scheduled installation date to allow the Supplier to perform a site inspection to verify the appropriateness of the sites before the installation of the Equipment, if required. The supplier shall inform the purchaser about the site preparation, if any, needed for installation, of the goods at the purchaser's site immediately after notification of award/contract.

2.40 [Import and Export Licenses](#)

2.40.1 If the ordered materials are covered under restricted category of EXIM policy in India the Bidder/ Agent may intimate such information for obtaining necessary, license in India.

2.40.2 If the ordered equipment is subject to Bidder procuring an export license from the designated government agency / country from where the goods are shipped / sold, the vendor has to mention the name, address of the government agency / authority. The Bidder must also mention the time period within which the license will be granted in normal course.

2.41 [Risk Purchase Clause](#)

2.41.1 If the supplier fails to deliver the goods within the maximum delivery period specified in the contract or Purchase Order, the purchaser may procure, upon such terms and in such a manner as it deems appropriate, Goods or Services similar to those undelivered and the Supplier shall be liable to the purchaser for any excess costs incurred for such similar goods or services.

2.42 [Option Clause](#)

2.42.1 The Purchaser reserves the right to increase or decrease the quantity of the required goods up to 25% (Twenty-Five) per cent at any time, till final delivery date (or the extended delivery date of the contract), by giving reasonable notice even though the quantity ordered initially has been supplied in full before the last date of the delivery period (or the extended delivery period)

2.43 [Integrity Pact](#)

- 2.43.1 The SCC shall specify whether there is a need to enter into a separate Integrity pact or not.
- 2.43.2 The names and contact details of the Independent External Monitors (IEM) on the event of the need of IP is as detailed in the SCC.

2.44 [Order Acceptance](#)

- 2.44.1 The successful bidder should submit Order acceptance **within 14 days from the date of issue of order/signing of contract**, failing which it shall be presumed that the Bidder is not interested and his bid security is liable to be forfeited pursuant to clause 1.16.9 of ITB.

CHAPTER 2

SPECIAL CONDITIONS OF CONTRACT (SCC)

The following Special Conditions of Contract (SCC) shall supplement and / or amend the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail over those in the GCC.

Sl.No.	GCC Clause Ref	Condition
1	GCC 2.1.1(l)	The Purchaser is: The Director CSIR- National Aerospace Laboratories HAL Airport Road, Kodihalli, Bengaluru – 560017 Karnataka-India Tel #: 00 91 80 2508 6040/6041/6044 Fax #: 00 91 80 25269611 Email: purchasek@nal.res.in/mkala@nal.res.in Bill to address is same as above
2	GCC 2.1.1(m)	The Final Destination is: CSIR- National Aerospace Laboratories HAL Airport Road, Kodihalli, Bengaluru – 560017 Karnataka-India Tel #: 00 91 80 2508 6040/6041/6044 Fax #: 00 91 80 25269611 Email: purchasek@nal.res.in/mkala@nal.res.in
3	GCC 2.13.1	Performance Security The amount of the Performance Bank Guarantee shall be 3% of the contract value to be submitted within 21 days from the date of PO valid up to 60 days after the date of completion of performance obligations including warranty obligations.
4	GCC 2.16.3	Delivery – Mode of Transportation/Shipment a) In case of supplies from within India, the mode of transportation shall be by Road . b) In case of supplies from abroad, the mode of transportation shall be by AIR . c) DELIVERY TERM: CSIR-NAL, Delivery
5	GCC 2.17.1	Insurance From Abroad The Insurance shall be for an amount equal to 110% of the CIF or CIP value of the contract from within “warehouse to warehouse (final destination)” on “all risk basis” including strikes, riots and civil commotion. Within India The Insurance shall be for an amount equal to 110% of the invoice value of the contract from “warehouse to warehouse (final destination)” on “all risk basis” including strikes, riots and civil commotion.
6	GCC 2.21.3	The period of validity of the Warranty shall be The Warranty details are as per Chapter-4

7	GCC 2.22.1	Payment Terms	
		The method and conditions of payment to be made to the Supplier under this Contract shall be as follows:	
		A	Payment for Goods supplied from abroad
		Payment of foreign currency portion shall be made in currency of the Contract through irrevocable Letter of Credit upon submission of documents specified in GCC Clause 2.16.	
		(a)	Payment term as per Chapter-4, Clause No.4.16.3
		(b)	The LC for 100% value of the contract shall be established after deducting the agency commission payable if any, to the Indian agent from the FOB/FCA value.
		(c)	<ul style="list-style-type: none"> ➤ The L/C will be confirmed at the suppliers cost, if requested specifically by the supplier. ➤ All bank charges abroad shall be to the account of the beneficiary i.e. supplier and all bank charges in India shall be to the account of the opener i.e. purchaser. ➤ If L/C is requested to be extended/ reinstated for reasons not attributable to the purchaser, the charges thereof would be to the suppliers' account. ➤ Payment of local currency portion shall be made in Indian Rupees within thirty (30) days of presentation of claim supported by a certificate from the Purchaser declaring that the Goods have been delivered and that all other contracted Services have been performed.
		B	Payment for Goods and Services supplied from India
		The payment shall be made in Indian Rupees, as follows:	
		(a)	Payment term as per Chapter-4, Clause No.4.16.3
		(b)	Payment term as per Chapter-4, Clause No.4.16.3 through Inland Letter of Credit opened in favour of supplier through CSIR-NAL Bank (State Bank of India), will be decided, as the case may be.
		(c)	E-Payment: All payments, CSIR-NAL prefers to make Electronic Transfers (RTGS) through State Bank Of India, NAL Branch, Bengaluru.
		(d)	All payments due under the Contract shall be paid after deduction of statutory levies at source (like TDS, Income Tax, TCS etc.), wherever applicable.
8	GCC 2.27.1	Liquidated Damages	
		(a)	If the Supplier fails to Supply, Install and Commission the system as per specifications mentioned in the order within the due date including training, the Supplier is liable to pay penalty of 0.5% of order value per week or part of a week.
		(b)	The maximum amount of penalty shall be 10%

9	GCC 2.34.1	Applicable Law / Jurisdiction The place of jurisdiction is Bengaluru , India.
10	GCC 2.35.1	For notices, the Purchaser's address is The Director Attention: The Controller of Stores & Purchase CSIR- National Aerospace Laboratories PB No.1779, HAL Airport Road, Kodihalli, Bengaluru – 560017 Karnataka-India Tel #: 00 91 80 25086040/6041/6044 Fax #: 00 91 80 25269611 Email: purchasek@nal.res.in , mkala@nal.res.in
11	GCC 2.43.1	Integrity Pact – The integrity pact is to be signed on Company's Letterhead.
12	GCC 2.43.2	The name and contact details of the IEMs are as under: Shri Anand Deep Flat No.804, Prithvi Ratan Green Apartments 7/172, Swaroopnagar Kanpur – 2080 005 Email: anand.deep117@gmail.com

CHAPTER 3

(To be filled by the bidder and enclosed with the Technical Bid)

SCHEDULE OF REQUIREMENT

The Schedule of Requirement must clearly specify **the time frame required (Schedule) for delivery of goods and services to be completed** by the bidder (in reference to Scope of Supply given in Clause-4.2 of Chapter-4) if the Contract is awarded for the offer / proposal submitted by the bidder in response to this Tender.

A) Delivery Schedule:

Sr. No.	Brief Description of Goods and Services	Quantity & Unit	Delivery Schedule

B) Period of delivery shall start from : _____

C) Term of Delivery / Delivery Term (named port of shipment or named place of delivery:

Goods from Abroad	
Goods from India	

D) Scope of Supply:

E) Time frame required for conducting installation, commissioning of the equipment, acceptance test, training, etc. after the arrival of consignment or before dispatch of equipment:

Sr. No.	Activity	Time Frame
1	Site Preparation (if required)	
2	Installation & Commissioning	
3	Acceptance Test	
4	Training (Location, No. of persons, period of training, nature of training)	
5		

Place : _____ Signature of the Bidder : _____

Date : _____

Notes for Bidders:

(1)	The delivery schedule shall clearly indicate the time period within which the successful bidder must deliver the consignment in full from the date of establishment of LC or from the date of contract or from the date of advance payment etc. It should also indicate separately the time period desired for installation and commissioning of the equipment after arrival of the consignment at the premises of the Purchaser.
(2)	The date or period for delivery should be carefully specified, taking into account
(3)	The implications of delivery terms stipulated in the Instructions to Bidders pursuant to the Incoterms rules (i.e., EXW, or CIF, CIP, FOB, FCA terms—that “delivery” takes place when goods are delivered to the carriers), and
(4)	The date prescribed herein from which the delivery obligations start (i.e., notice of award, contract signature, opening or confirmation of the letter of credit, date of releasing advance payment etc.).

CHAPTER 4

Specifications and Allied Technical Details

4.1 End Use: The deliverable system will be used in SARAS MK II.

COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH- NATIONAL AEROSPACE LABORATORIES (CSIR-NAL), a premier aerospace organization of India, is engaged in the Design, Development and Manufacture of a wide variety of fixed-wing, aircraft, avionics & aircraft sub-systems for over 50 years.

CSIR-NAL located at Bangalore, India currently designs SARAS MK-2 aircraft for civil applications. CSIR-NAL Bangalore now intends to manufacture CSIR-NAL SARAS-MK2 aircraft for commercial operation. This aircraft is required to be fitted with avionics suite duly certified by CEMILAC/FAA/EASA/DGCA. Further, the aircraft with such avionics suite shall be supplied to customers with certification from Indian Airworthiness Agency i.e., Director General of Civil Aviation (DGCA)/Centre for Military Airworthiness Certification (CEMILAC).

CSIR-NAL SARAS-MK2 aircraft shall be used primarily for the Passenger transport, Cargo transport, Air Ambulance

4.2 Integrated Avionics and Autopilot System

	Sl. No.	Item Description (Cat II Flight Operations Compliant)	Configuration	Controlled(C) / Uncontrolled(U)
I		Integrated Avionics suite with following systems compliant to the Electrical, Installation, Functional, Certification, Specification given in 4.2.1 to 4.2.6		
A		COMMUNICATION SYSTEMS		
	1	VHF Communication System	Dual (two independent Systems)	U
		a) Communication Receiver VHF		
		b) Mount and connector Kit		
		c) Installation Kit		
		VHF Communication System Antenna		
		a) Antenna - Bottom		
		b) Antenna - Top		
	2	Audio Management System (AMS)	Dual (two independent Systems)	C
		a) Connector Kit		
		b) Head set		
		c) Audio Jacks		
		d) Speaker with installation kit		
	3	Emergency Locator/Transmitter (ELT)	Single	C
		a) ELT		
		b) ELT Antenna with connector kit		
	4	Radio Tuning Unit	Dual (two independent Systems)	C
		a) Mating Connector Kit		
		b) Strain Relief connectors		
	5	Audio Warning Generator	Single	C
		Mating Connectors Kit		

B	NAVIGATION SYSTEMS					
	6	VIR System with VOR, LOC, GS, MB VIR	Dual (two independent Systems)	U		
		a) Navigation Receiver				
		b) Mount and connector Kit				
		c) Installation Kit				
		Receivers Antenna				
		a) Marker beacon antenna with dual port				
		b) Phasing coupler				
		c) Glide slope antenna with dual port				
		d) VOR/LOC antenna with phasing coupler & power divider				
	7	Attitude Heading Reference System (AHRS)	Dual (two independent Systems)	U		
		a) Mating Connector				
		b) Flux Detector Unit				
		c) Flux detector Mating Connector				
		d) Control Panel				
		e) Control Panel Mating Connectors				
	8	Automatic Direction Finder (ADF) System	Single	U		
		a) Receiver with Lock Relay				
		b) Antenna				
		c) Mounting Kit				
		d) Connector Kit				
		e) Antenna Mating Connector				
	9	Air Data Computer	Dual (two independent Systems)	U		
		Back Shell (main ADCU)				
		a) Mating Connectors and installation kit if any				
		Total Air Temperature Sensor (TAT)				
		a) Installation Kit				
		b) DC Current level detector				
		c) Mating Connector				
		Dual Static and a Pitot Pressure Port/sensor				
		a) Static Pressure sensor with accessories and mounting kit				
		b) DC Current Level Detector				
		c) Pitot Pressure sensor with accessories and mounting kit				
		d) Complete installation kit for pitot Sensor				
		e) DC Current Level Detector for both Static and Pitot				
		f) Mating Connector and installation kit for				
		10	Distance Measuring Equipment (DME) System		Dual (two independent Systems)	U
			a) DME Receiver			
			b) Mount Kit			
			c) Connector Kit			
			DME System Antenna			
			a) Antenna, L-Band			

	11	NAV/Flight Management System (FMS) with Independent GPS system	Dual (two independent Systems)	U
		a) Navigation Computer		
		b) Configuration Module		
		c) CDU		
		d) Installation mounting and Connector kit		
		e) Data Transfer Unit		
		f) DTU Installation Kit		
		g) GPS Antenna		
		h) GPS Antenna Installation Kit		
C	RADAR SUITE			U
	12	Color Weather Radar System	Single	
		a) Antenna / Receiver / Transmitters shall not exceed 18 inches		
		b) Installation Kit		
		c) weather radar indicator		
		d) Antenna/Receiver		
		e) Mounting tray Kit		
		f) Configuration Module		
		g) Indicator Installation Kit		
	13	Terrain Awareness Warning System (TAWS) with reactive and predictive wind shear features	Single	U
		a) TAWS Computer w/o dedicated GPS input		
		b) Mounting Tray		
		c) Configuration Module		
		d) Connector kit with end fittings		
		e) TAWS Annunciator Assemblies		
	14	Radio Altimeter (RA) System	Dual (two independent Systems)	U
		a) Transmitter / Receiver		
		b) Antenna		
		c) Mount Kit		
		d) Mating Connector kit		
		e) RF connectors		
D	SURVEILLANCE SUITE			U
	15	TCAS II	Single	
		a) Tx/Rx		
		b) Directional Antenna		
		d) TCAS Installation kit		
		e) TTR mount, installation and connector kit		
	16	Mode S ATC Transponder	Dual (two independent Systems) 2 (Mode-S Transponder), 1 (ADS B IN -Out)	
		a) Transponder		
		b) Mounting Tray		
		c) Connector Kit		
		d) Mating TNC 90 degree bend		
		e) Gasket		
		ATC Transponder (Mode S) Antenna		
		a) Antenna, L-Band		

E	COCKPIT DISPLAYS			
	17	Cockpit/Displays (Configurable PFD/MFD)	4 Display Set	C
		a) Connectors, installation and mounting Kit		
		b) Installation Mounts		
F	DATA RECORDERS			
	18	Solid State Flight Data Recorder	Refer note 4	U
		a) Control Unit		
		b) Mating connector kits		
	19	Solid State Voice Recorder	Refer note 4	U
		a) Control Unit		
		b) Mating connector kit		
		d) Cockpit Area Microphone		
G	Digital standby System			
	20	Digital standby system with inbuilt battery	single	U
		a) Total Air Temperature Sensor (TAT) with heater		
		b) Dual Static Port with heater		
		c) Pitot Port with heater		
		d) DC Current Level Detectors for static, pitot and TAT		
		e) installation kit		
H	Flight data acquisition Unit			
	21	Flight data acquisition Unit with 717 interfaces	single	U
		Installation Kit		
II	Autopilot System with Actuators and Mode Select Panel compliant to CAT II and FAR 23 compatibles to Avionics suite offered as per I above			
	22	Autopilot System (with one AP and dual FD system) for FAR 23 category Aircraft meeting Cat II requirements with Mode Select Panel, Rudder, Aileron and Elevator Actuators, Pitch Trim Actuator and Autopilot Computer	Dual (two independent Systems)	
III	Inertial Reference System part of Navigation system		Single	U
	23	Inertial Reference System		
		a) Magnetic sensor		
		b) Installation Kit		

NOTES:

1. The above list of LRUs are for typical architecture and indicative (except for SSCVFDR), the Supplier can offer the respective functionality bundled in single or multiple LRUs, However the functionality shall not differ from specifications given in 4.2.6 for respective LRUs. Supplier shall ensure that the individual systems proposed by Supplier is compatible with each other as per the requirements in terms of electrical, protocol, parameters and connectivity. Offered combination must be certifiable by FAA/EASA/DGCA/CEMILAC.
2. Systems defined in Table above must be offered along with all the associated ancillary LRUs, special cables, Antennas (if applicable), Installation kits (connectors, fasteners, screws etc.), etc.
3. The indicatory list of component accessories for Avionics and Autopilot System is provided in Appendix B. Appendix B may be enlarged with new parts and is required to be submitted as part of Technical Bid.
4. Supplier can supply either two integrated SSCVFDR or individual FDR and CVR separately.
5. For dual redundant systems, supplier shall supply two separate LRUs along with all the accessories.

6. Few LRUs like FMS, EGPWS need to be loaded with databases specific to Asian region.
7. The table above lists the Mounting kits. However, if the LRU does not require any special mounting arrangement, then the mounting kit is not applicable.
8. Each LRU shall provide outputs in at least three isolated buffered output in ARINC 429 and preferably four outputs
9. SARAS MK II is completely integrated solution and hence supplier shall quote for complete RFQ. No split order is allowed and hence partial quote shall not be accepted. **No split order is allowed/applicable for SARAS Mk II avionics Suite.**
10. In section 4.2, against each LRU's the environmental category has been provided as Controlled (C)/ Uncontrolled (U) based on the traditional known LRU/System placements on aircraft. However, supplier shall provide the proposed avionics configuration based on the Controlled (C)/ Uncontrolled (U), considered during design/certification phase of proposed avionics system/LRU.
11. All the LRU's shall be stated whether hermitically sealed or not.
12. Installation kit shall comprise of connectors, backshells, mounting trays, accessories etc. as applicable for all LRU's.

Each of the LRU is specified with requirements separately, however few generic specifications which are applicable to all LRU's are detailed in this section.

4.2.1 Electrical Requirements

All LRUs shall be compatible with 28V DC power source with

- Minimum 18 V DC
- Nominal 28 V DC
- Maximum 32 V DC
- Emergency Minimum (For Displays, Crew Alert Systems, Warning systems, communication systems etc.,) 12 V DC for 1 second. 18 V DC for 30 minutes

4.2.2 Installation Requirements

SARAS Mk II aircraft is designed to fly at an altitude of 35000 ft above MSL and compliant to FAR 23/91/135.

All LRUs are proposed to be installed in Avionics Bay outside the pressurized cabin (nose of the aircraft) which is not conditioned environment and hence the qualification specifications shall be accordingly chosen.

Also, few of the LRUs like displays, RTU, AMS etc., are installed in the cockpit (conditioned environment) either on MIP of consoles accordingly and hence the requirements be taken accordingly.

4.2.3 DO 160X Requirements

As per the above installation requirements, the DO 160X specifications shall be followed accordingly (critical requirements shall be considered for EMI/EMC – direct/In-direct, lightning, shock and vibration etc.). In addition, Supplier shall comply to the minimum FAR 23 category Class IV specific requirements. List of equipment in controlled environment and in uncontrolled environment tentative

Uncontrolled(U) Environment is for systems located in Nose Bay. Nose Bay is uncontrolled temperature and pressure Area. Environmental Profile for Uncontrolled Environment needs to be considered for altitudes up to 35000 Feet.

Controlled(C) Environment is applicable for Equipment operating from Cockpit or Cabin where the altitude is maintained at 8000 ft with temperature of 20 to 33 DegC.

Section 4.2 describes the various LRUs and systems with Controlled / Uncontrolled category for each LRU/system.

In case if the LRUs are not compliant to DO 160G, the supplier shall do the gap analysis to the LRUs which are compliant to earlier versions w.r.t DO 160G. **If gap analysis indicates that the difference between the certified version and DO 160 G is major as per FAA order 8150-1D**, the supplier shall comply to the Gap analysis findings. In such cases the delta tests to be carried out to meet the DO 160G specifications (if required) shall be in co-ordination with Indian Certification Agency.

LRU's shall meet the Do 160 compliance for SARAS Mk II Aircraft as per the Environmental Map in **Appendix E** in this document.

4.2.4 Certification Requirements

All LRUs shall be TSO certified by FAA or EASA or any other agency which in turn shall be acceptable to DGCA and CEMILAC. Each of the system shall be cleared for airworthy and be released with airworthy release forms.

4.2.5 Weight and Power Requirements

As mandatory requirements, weight, volume and power shall be as low as possible. The offering in terms of lowest weight and power will derive technical benefit in Technical Evaluation.

4.2.6 Specifications (Cat II operations Compliant)

The Avionics suite being proposed needs to be compliant to applicable operations as per AC 120-29A. Proposal to be submitted for Cat II operations compliant Avionics Suite.

4.2.6.1 Communication System

4.2.6.1.1 VHF communication system

The VHF COM system is an airborne Very High Frequency (VHF) communication system which provides voice communication in this frequency range. A typical VHF COM system consists of a Transceiver, suitable Control Head, and an Antenna.

4.2.6.1.1.1 General System Requirements

The product shall have state-of-the-art digital signal processing technology, digital audio, a consolidated tuning/data/audio bus. The product shall also provide an emergency mode that with a single discrete input it will channel to 121.5 MHz with direct interface to the headsets such that you will need nothing else to keep in communications.

The system shall also have advanced comprehensive self-diagnostic features with interface to the onboard maintenance system.

In addition to complying to the "Minimum Operational Performance Standards for Airborne Radio Communications Equipment Operating Within the Radio Frequency Range 117.975 - 137.000 MHz" extendable up to 152.0 MHz spelled out in the standard listed in the applicable TSO for the VHF COM system, the offered VHF COM system must also comply to the below requirements:

Sl.No.	Parameter	Requirement
1.	Channel Spacing	8.33/25 KHz voice channel spacing
2.	Power Output	Minimum 18 Watts
3.	Nominal Operating Voltage	28 VDC
4.	System Control	Through Radio Tuning Heads through digital ARINC 429 bus preferably or any other civil standard bus.
5.	Certification	FAA/EASA TSO for installation as per FAR Part 23 (Amdt. 23-64) Class IV Airplane. Compliance needs to be according to Appendix A.
6.	Environmental Compliance	According to the applicable levels in DO-160 Compliance need to be according to section 4.2.3.

4.2.6.1.2 Audio Management System / DIGITAL INTERPHONE SYSTEM

Digital Interphone System or Audio Management System (AMS) provides communication between pilot, copilot and operator. This controls the output of the communications Transmitter Receivers (VHF1, VHF2, and HF), Navigation Receivers (NAV1, NAV 2, ADF, DME, MKR). Also interfaces with various fixed input audio from systems like TAWS, TCAS, Radio Altimeter, Autopilot and connects to the Flight Crew headsets.

The system shall be a fully digital (audio and control), secure, audio management system that integrates the routing and distribution of audio and data between crew members, maintenance crew, technicians and the host's aircraft's communication data and recording systems. It shall support multiple users (typically around 20), intercom only users, multiple radios, receivers and recording systems in addition to internal intercom network.

An auditory alert that sounds/chimes feature as part of the AMS system for the requirements like

- Passenger Call (High Tone)
 - Attendant Call (High/Low Tone)
 - Attendant Emergency Call (High/Low Tone Repeated Three Times)
 - Seat Belt Sign (Low Tone)
 - Smoking Sign (Low Tone)
- Shall be provided.

4.2.6.1.2.1 General System Requirements

In addition to complying to the "Minimum Operational Performance Standards for Airborne Intercom Equipment" spelled out in the standard listed in the applicable TSO for the Intercom system, the offered Interphone system must also comply to the below requirements:

Sl.No.	Parameter	Requirement
1.	Nominal Operating Voltage	28 V DC
2.	Transmit and Receive Channels	Minimum 5 (COM1 to COM4 plus Public Address)
3.	Receive Channels	Minimum 7 (NAV1, NAV2, ADF, DME1, DME2, ADF, MKR etc.) plus 5 fixed inputs
4.	System Configuration	System configuration and Impedance matching of Transmitters/Receivers shall be through a PC or Laptop
5	Certification	FAA/EASA TSO for installation as per FAR Part 23 (Amdt. 23-64) Class IV Airplane. Compliance needs to be according to Appendix A.
6	Environmental Compliance	According to the applicable levels in DO-160 Compliance need to be according to section 4.2.3.
7.	Audio Select Panels/Audio Control Unit	02 (pilot and copilot) (discrete Audio Select Panels or in-built Audio/Tx selections may be offered).
8	Remote Unit/ Junction Box/ System interface and processor unit	Remote Unit/ Junction Box/ System interface and processor unit may be offered in discrete form or in integrated form with Audio Select Panels or with any other interphone system unit. This unit shall be responsible for receiving the commands from the Audio Selector Panels and accordingly shall influence and process all the incoming and outgoing audio signals, shall perform the logical functions necessary for keying the transceivers and for aircraft intercommunication and shall generate Different aural tone signals which may be activated through discrete control lines. Also, the Audio Warning Generator with synthesized audio for all mandatory audio warning. Audio Warning Generator shall have at least 18 channels for synthesized audio interface.
9	Public Address (PA) system requirements	Public address system shall be offered to enable air-crew to make announcements in the cabin area.
10	Speakers in cabin	Supplier shall provide the independent passenger address (PA) system with at least 4 speakers for 19 seater category aircraft. This PA shall also receive Audio input from Audio Management unit from pilot/co-pilot.
11.	Mike and Phone line connections	Up to 04 Mike and Phone Jacks (02 each in cockpit and in cabin) shall be connected to the interphone system.
12	Press To Talk (PTT) input	Interphone system shall receive PTT input in Low active < 0.3V mode
13	Volume Control	Independent Volume control function (for each channel) shall be provided to change volume of the received audio signal (s).

Sl.No.	Parameter	Requirement
14	Mike sensitivity	Control to change the Mike sensitivity should be available on the Audio Select Panel.
15	Aircraft Intercommunication	Aircraft intercom between flight-crew shall be available both in Hot Mike mode and in IC Key or PTT controlled mode.
16	Intercom Circuits	Two intercom circuits shall be available in the system to isolate & connect the cockpit and cabin inter-communication.
17	Alert tone activation inputs	Programmable active low (total 5 to 8). however, the supplier may propose different logic also based on the source logic compatibility
18	Emergency Mode	When this mode is activated direct audio signal from VHF shall be routed to headset speaker and mic. All other functionalities shall be by passed. Typically, this mode will be activated when power failure to AMS or AMS become un serviceable

4.2.6.1.3 Emergency Locator Transmitter System (ELT)

The Emergency Locator Transmitter (ELT) transmits a distinctive signal on the emergency frequencies 121.5 MHz, 243.0 MHz and 406.025 MHz with inclusion of transmission of last known aircraft position co-ordinates on 406.025 MHz. The ELT is activated with an impact switch or manually. A typical system consists of a transmitter, suitable control head, impact switch and/or Water Activation Switch, Antenna (to be installed on aircraft) and a whip antenna.

4.2.6.1.3.1 General System Requirements

In addition to complying to the "Minimum Operational Performance Standards for Airborne Radio Communications Equipment Operating with the distress Radio Frequencies of 121.5 MHz, 243 MHz and 406.025 MHz" spelled out in the standard listed in the applicable TSO for the Emergency Locator Transmitter system, the offered ELT system must also comply to the below requirements:

Sl. No.	Parameter	Requirement
1.	Frequency Range	121.5 MHz, 243 MHz and 406.025 MHz
2.	Transmit Power	24 hours minimum, 5 watts Peak Effective Radiated Power (PERP) at 406.025 MHz. 48 hours minimum, > 0.1 watts Peak Effective Radiated Power (PERP) at 121.5 MHz and 243 MHz
3.	Nominal Operating Voltage	28 VDC
4.	Position data input from onboard NAV system	Available
5	Certification	FAA/EASA TSO for installation as per FAR Part 23 (Amdt. 23-64) Class IV Airplane. Compliance needs to be according to Appendix A.
6	Environmental Compliance	According to the applicable levels in DO-160 Compliance need to be according to section 4.2.3.
7	Transition Activation	Manual and Automatic
8	Self-Test	Self-test function to permit self-test before flight

4.2.6.1.4 Radio Tuning Heads or Radio Tuning Units

Minimum two Independent Radio Tuning Heads shall be provided to enable control of the following systems offered by the Supplier:

- Dual VHF NAV systems
- Single ADF system
- Dual DME
- Dual VHF COM systems
- Single HF COM system
- ATC code setting
- TCAS with dual Mode-S (ADS-B OUT functionality)
- Other compatible Radios

If the solution is software-based application for the Radio Tuning Heads, then the complete application shall be able to display on all the displays.

4.2.6.1.5 Audio Warning Generator

Supplier shall provide the standard COTS Audio Warning Generators coupled with the Audio Management System (AMS). The system shall also provide an interface to the MFD to display the warnings and the Central Maintenance Computer to record the warnings with time stamp. However, as part of flight testing, CSIR NAL would like to add few more audio warnings and hence the Audio Warning System shall be able to accommodate additional around 10 audio warnings apart from the mandate list shown below:

List of minimum mandate Audio Warnings

1. Engine Fire
2. Lavatory Smoke
3. Battery Discharge
4. Stall
5. Abort Take off
6. Altimeter Setting
7. Speed Limit
8. Landing Gear
9. Pitch Trim

Supplier shall provide mechanism for user to load the synthesized digital audio files to the AWS without effecting the cert and qual.

If the proposed system of Audio Warning System by Supplier has the mechanism and capacity to accommodate additional user defined audio warnings (preferably in jpg audio format), then the NRE for this activity is not required to be quoted in the commercial bid.

4.2.6.2 Navigation System

4.2.6.2.1 VOR or VHF Navigation System

VHF Navigation System provides radio navigation function. VHF Navigation system comprises of a VHF Omni-directional Receiver (VOR) and Instrument Landing System (ILS) (Localizer, Glideslope, and Marker) receivers, suitable Control Head (s) and suitable antennas. The system being offered should be capable of performing CAT II ILS capability.

4.2.6.2.1.1 General Specifications of VHF Omni range (VOR) Receiver:

In addition to complying to the "Minimum Operational Performance Standards for Airborne VOR Receiving Equipment Operating spelled out in the standard listed in the applicable TSO for the VOR Receiving Equipment Operating within the radio frequency range of 108-117.95 MHz, the offered VOR receiving equipment must also comply to the below requirements (The system shall meet or exceed or exceed the RTCA Minimum Performance Standard)

Sl. No.	Parameter	Requirement
1.	Channel Spacing	50 KHz minimum
2.	Nominal Operating Voltage	28 VDC
3.	System Control	Through Radio Tuning Heads or any other LRU with native interface
4	Certification	FAA/EASA TSO for installation as per FAR Part 23 (Amdt. 23-64) Class IV Airplane. Compliance needs to be according to Appendix A.
5	Environmental Compliance	According to the applicable levels in DO-160 Compliance need to be according to section 4.2.3.

4.2.6.2.1.2 General Specifications of Localizer Receiver:

In addition to complying to the "Minimum Operational Performance Standards for Airborne ILS Localizer Receiving Equipment Operating Within the Radio Frequency Range of 108-112 MHz", the offered Localizer receiving equipment must also comply to the below requirements:

Sl. No.	Parameter	Requirement
1.	Channel Spacing	50 KHz minimum

Sl. No.	Parameter	Requirement
2.	Nominal Operating Voltage	28 VDC
3.	System Control	Through Radio Tuning Heads or any other LRU with native interface
4.	Certification	FAA/EASA TSO for installation as per FAR Part 23 (Amdt. 23-64) Class IV Airplane. Compliance needs to be according to Appendix A.
5.	Environmental Compliance	According to the applicable levels in DO-160 Compliance need to be according to section 4.2.3.

4.2.6.2.1.3 General Specifications of Glide slope Receiver:

In addition to complying to the "Minimum Operational Performance Standards for Airborne ILS Glide Slope Receiving Equipment Operating Within the Radio Frequency Range of 328.6-335.4 MHz", the offered Glide Slope Receiving Equipment must also comply to the below requirements:

Sl. No.	Parameter	Requirement
1.	Channel Spacing	150 KHz minimum
2.	Nominal Operating Voltage	28 VDC
3.	System Control	Through Radio Tuning Heads or any other LRU with native interface
4.	Certification	FAA/EASA TSO for installation as per FAR Part 23 (Amdt. 23-64) Class IV Airplane. Compliance needs to be according to Appendix A.
5.	Environmental Compliance	According to the applicable levels in DO-160 Compliance need to be according to section 4.2.3.

4.2.6.2.1.4 General Specifications of Marker Receiver:

In addition to complying to the "Minimum Performance Standards Airborne Radio Marker receiving equipment operating on 75 Megahertz", the offered Marker receiving equipment must also comply to the below requirements:

Sl. No.	Parameter	Requirement
1.	Nominal Operating Voltage	28 VDC
2.	Certification	FAA/EASA TSO for installation on FAR23 COMMUTERcategory aircraft. Compliance needs to be according to Appendix A.
3.	Environmental Compliance	According to the applicable levels in DO-160 Compliance need to be according to section 4.2.3.

4.2.6.2.2 Attitude and Heading Reference System (AHRS)

The AHRS is attitude and heading reference system that provides aircraft attitude, heading and flight dynamics (body rate and accelerations) information, which are typical used for flight control and pilot displays.

A typical AHRS system consists of an Attitude & Heading Reference Unit (AHRU), a Magnetic Sensor Unit (Flux valve), and a controller.

The system also shall provide three directions accelerations and angular rates of the aircraft body. The update rate of the acceleration, angular rates, attitudes shall be at minimum of 25 milli seconds in ARINC 429 Hi speed channel.

4.2.6.2.2.1 General System Requirements

In addition to complying to the "Minimum Operational Performance Standards for Attitude and Heading Reference System (AHRS) Equipment" spelled out in the applicable standard listed in the applicable TSO for the AHRS system, the offered AHRS system must also comply to the below requirements:

The AHRS parameters shall be complaint to ARINC 429 DITS reference or equivalent digital bus with updates rates of minimum 40 Hz.

Sl.No	Parameter	Requirement
1.	Nominal Operating Voltage	28 V DC
2.	AHRS Control (DG/SLEW)	AHRS system controls can be integrated with display or dedicated control panel may also be offered.
3.	Certification	FAA/EASA TSO for installation as per FAR Part 23 (Amdt. 23-64) Class IV Airplane. Compliance needs to be according to Appendix A.
4.	Environmental Compliance	According to the applicable levels in DO-160 Compliance need to be according to section 4.2.3.

4.2.6.2.3 Automatic Direction Finder (ADF) System

The ADF system provides airplane bearing information to any selected NDB (Non- Directional Beacon) ground station, and the audio reception of radio stations broadcasting on the AM band.

A typical ADF system consists of an ADF Receiver, Loop and sense antenna and a suitable Control Head. Bearing information to the selected ground station is derived by measuring the angle between the beacon signal and the longitudinal axis of the airplane.

4.2.6.2.3.1 General System Requirements

In addition to complying to the "Minimum Operational Performance Standards for Automatic Direction Finding (ADF) Equipment" spelled out in the standard listed in the applicable TSO for the ADF system, the offered ADF system must also comply to the below requirements:

Sl. No.	Parameter	Requirement
1.	Frequency Range	190.000 kHz to 1799.5 kHz
2.	Channel Spacing	500 Hz
3.	Nominal Operating Voltage	28 VDC
4.	System Control	Through Radio Tuning Heads
5.	Certification	FAA/EASA TSO for installation as per FAR Part 23 (Amdt. 23-64) Class IV Airplane. Compliance needs to be according to Appendix A.
6.	Environmental Compliance	According to the applicable levels in DO-160 Compliance need to be according to section 4.2.3.

4.2.6.2.4 Air Data Computer (ADC)

Air Data Computer (ADC) unit measures barometric altitude, airspeed and temperature in the atmosphere.

4.2.6.2.4.1 General System Requirements

In addition to complying to the "Minimum Operational Performance Standards for Air Data Computer (ADC) Equipment" spelled out in the standard listed in the applicable TSO for the ADC system, the system shall be RVSM compliant. The system shall also use the state-of-the-art sensors that has excellent long-term stability, low weight and reduced maintenance. The offered ADC system must also comply to the below requirements:

Sl.No	Parameter	Requirement
1.	Nominal Operating Voltage	28 VDC
2.	Input Interface	TAT probe, Barometric Input
3.	Certification	FAA/EASA TSO for installation as per FAR Part 23 (Amdt. 23-64) Class IV Airplane. Compliance needs to be according to Appendix A.
4.	Environmental Compliance	According to the applicable levels in DO-160 Compliance need to be according to section 4.2.3.
5.	Sensors	Pitot Tubes, Pressure Ports and Total Air Temperature Sensors required for system to be part of the Air Data Computer

Supplier shall supply dedicated Pitot tube (1 count), Static port (2 count), TAT (1 count) sensors for each ADCU/ADAHRS/IRS.

Outside Air Temperature (OAT) sensor shall also be supplied and the display of the Outside Air Temperature can be in PFD or MFD OR if ADAHRS provides the OAT then no separate system is required.

4.2.6.2.5 Distance Measuring Equipment (DME) System

The Distance Measuring Equipment (DME) continuously measures the slant range between the airplane and selected VOR/DME ground station. From these distance values, the ground speed and time to station are computed and displayed.

A typical DME system consists of a Transceiver, suitable Control Head, and an Antenna.

4.2.6.2.5.1 General System Requirements

In addition to complying to the " Minimum Performance Standard for Airborne Distance Measuring Equipment (DME) Operating Within the Radio Frequency Range of 960-1215 Megahertz" spelled out in the standard listed in the applicable TSO for the DME system, the offered DME system must also comply to the below requirements:

Sl. No.	Parameter	Requirement
1.	Nominal Operating Voltage	28 VDC
2.	System Control	Through Radio Tuning Heads
3.	Certification	FAA/EASA TSO for installation as per FAR Part 23 (Amdt. 23-64) Class IV Airplane. Compliance needs to be according to Appendix A.
4.	Environmental Compliance	According to the applicable levels in DO-160 Compliance need to be according to section 4.2.3.

4.2.6.2.6 NAV/Flight Management System (FMS)

Flight Management System (FMS) functionality with SBAS (GAGAN compatible) GPS input

- A. Flight Management System (FMS) functionality shall be provided to increase reliability, situational awareness and safety and to reduce crew workload.
- B. FMS functionality shall incorporate the following features:
 - a) Flight planning using multi-sensor navigational inputs
 - b) LNAV and LNAV/VNAV
 - c) LPV, APV and LP Compliant
 - d) PBN-RNAV and RNP 0.3
 - e) Auto Tuning/control for the aircraft navigation sensors
 - f) Fuel management
- C. Details of Navigation Databases applicable to the FMS shall be provided by the Supplier. Source and details of subscription of the databases and the update frequency also to be provided.
- D. FMS functionality shall either have an Inbuilt GPS or a separate GPS receiver with antenna shall be provided.
- E. The provided GPS shall be SBAS (Satellite Based Augmentation System) enabled system compatible with Indian Satellite Based Augmentation System named as GPS Aided Geo Augmented Navigation (GAGAN) system.
- F. GPS shall have features like Baro-aiding, RAIM and FDE and should be certified to Class 3 SBAS.
- G. GPS receiver (s) along with antenna (s) shall be provided in sufficient quantity to equip the aircraft with above PBN capability during Oceanic, En-route flying and also to perform LP/LPV approaches.

- H. IRNSS and GAGAN capability to be part of the FMS functionality.
- I. Calculating optimum rate of climb/descent, altitude, power setting. – Controlling the aircraft to meet these optimum parameters through autopilot and auto-throttle. – Guiding pilot-controlled flight path through a flight director, and target speed and engine setting bugs. – Cross referencing multiple navigation sources to continually update position. – Automatically tuning en-route nav aids. – Alerting pilots of systems status and malfunctions
- J. The system shall have the capability to interface with the autopilot and provide the right guidance outputs.
- K. Dual FMS with independent GPS for each FMS to be provided.

4.2.6.3 Radar Suite

4.2.6.3.1 Color Weather Radar System

Weather Radar provides continuous en-route weather information relative to cloud formation, rainfall rate, thunderstorms and icing conditions, i.e., it indicates the presence and strength of precipitation and is intended to allow the operator to avoid thunderstorms and associated turbulence.

A typical Weather Radar system comprises of a Transceiver, a flat plate Antenna and a suitable Display and Control unit. Here, Glass cockpit MFD shall act as the Display and Control unit for Weather Radar and a combined Antenna, Receiver and Transmitter (ART) unit shall be offered.

The system shall also provide wind-shear related warnings.

4.2.6.3.1.1 General System Requirements

In addition to complying to the "Minimum Operational Performance Standards for Airborne Weather Radar Equipment Operating Within the Radio Frequency Range of 9375 MHz \pm 30 MHz" spelled out in the standard listed in the applicable TSO for the Weather Radar, the offered Weather Radar equipment must also comply to the below requirements:

Sl.No.	Parameter	Requirement
1.	Nominal Operating Voltage	28 VDC,
2.	Weather Compensation/Range	0-240 NM (Minimum 240 Nautical Miles)
3.	Weather Radar Control	Weather Radar controls shall preferably be integrated on MFD bezel/soft controls or on separate MFD control panels. However, dedicated control panel for Weather Radar may also be offered.
	Display	Shall have suitable interface to the MFD.
4.	Automatic Tilt Control	Required
5.	Antenna size	18" maximum
6.	Scan angle	90 degrees minimum
7.	Tilt Angle	\pm 15 deg
8.	Vertical Profile	\pm 30 deg
9.	Sector Scan	Required
10.	Scan Rate	25 deg/second
11.	Self-Test	Self-test function to permit self-test before flight
12.	Certification	FAA/EASA TSO for installation as per FAR Part 23 (Amdt. 23-64) Class IV Airplane. Compliance needs to be according to Appendix A.
13.	Environmental Compliance	According to the applicable levels in DO-160 Compliance need to be according to section 4.2.3.

- a) Reactive and predictive Wind Shear system to be the part of either integrated TAWS or the color weather radar suite without demanding additional ground support and without compromising performance.
- b) Antenna size shall not exceed 18".

4.2.6.3.2 Enhanced Ground Proximity Warning System (EGPWS) / Terrain Awareness and Warning System (TAWS) (Class-A)

The Enhanced Ground Proximity Warning System (EGPWS) helps to prevent accidents caused by Controlled Flight into Terrain (CFIT), obstacles.

4.2.6.3.2.1 General System Requirements

The TAWS/ EGPWS should provide automatically, as a minimum, warnings under the following circumstances as part of major 6 Modes of warnings:

- a) Excessive descent rate;
- b) Excessive terrain closure rate;
- c) Excessive altitude loss after take-off or go-around;
- d) Unsafe terrain clearance while not in landing configuration;
- i) Gear not locked down;
- ii) Flap not in landing position; and
- e) Excessive descent below the instrument glide path.

In addition, the system shall have a forward-looking terrain avoidance function to be presented on Glass Cockpit MFD, Reactive Wind shear and Predictive Wind shear system.

Sl. No.	Parameter	Requirement
1.	Nominal Operating Voltage	28 VDC
2.	Class of TAWS	Class A
3.	TAWS system Control and Self-test	TAWS controls shall preferably be integrated on MFD bezel/soft controls and/or on separate MFD control panels. However, dedicated control panel/discrete switches may also be offered.
4.	Output	Terrain Alerting & Display on Glass Cockpit MFD. Mode annunciations on Glass Cockpit MFD. Audio in crew headsets through Interphone system and speakers if selected.
5.	Data Base coverage	Indian Sub-continent (minimum) as part Asian region
6.	Certification	FAA/EASA TSO for installation as per FAR Part 23 (Amdt. 23-64) Class IV Airplane. Compliance needs to be according to Appendix A.
7.	Environmental Compliance	According to the applicable levels in DO-160 Compliance need to be according to section 4.2.3.

4.2.6.3.3 Radar Altimeter (RA) System

Radio Altimeter System provides the pilot with altitude information during the approach phase of the flight. A typical Radio Altimeter (RA) system consists of a Transceiver, a Display Unit and Antenna. Here, Glass Cockpit MFD shall act as the Display Unit for RA.

4.2.6.3.3.1 General System Requirements

In addition to complying with the "Minimum Operational Performance Standards for Airborne Low Range Radio Altimeter" spelled out in the applicable TSO, the offered Radio Altimeter System must also comply to the below requirements:

Sl. No.	Parameter	Requirement
1.	Frequency Range	4.2 to 4.4 GHz
2.	Altitude range	0 to + 2,500 feet (minimum)
3.	Nominal Operating Voltage	28 VDC
4.	Certification	FAA/EASA TSO for installation as per FAR Part 23 (Amdt. 23-64) Class IV Airplane. Compliance needs to be according to Appendix A.
5.	Environmental Compliance	According to the applicable levels in DO-160 Compliance need to be according to section 4.2.3.

4.2.6.4 SURVEILLANCE SUITE

4.2.6.4.1 TRAFFIC COLLISION AVOIDANCE SYSTEM (TCAS)-II

TCAS is an aeroplane system based on Secondary Surveillance Radar (SSR) transponder signals which operates independently of ground-based equipment to provide advice to the pilot on potential conflicting aeroplane that are equipped with SSR transponders. A TCAS II system provides vertical resolution advisories (RAs) in addition to the traffic advisories.

The nearby transponder-equipped aircraft are shown on a traffic advisory display. The TCAS system gives traffic advisory alerts and vertical maneuvering resolution advisories during danger conditions to prevent airborne collisions. Glass Cockpit SMFD shall act as display unit for TCAS system and Radio Tuning Head in Glass Cockpit shall preferably act as TCAS control unit or a dedicated TCAS control unit may also be offered. ADS B IN Functionality needs to be offered as part of Collision Avoidance System in Avionics Suite.

4.2.6.4.2 General System Requirements

TCAS II shall perform the following functions:

- a) Surveillance;
- b) Generation of TAs;
- c) Threat detection;
- d) Generation of RAs;
- e) Co-ordination; and
- f) Communication with ground stations.
- g) ADS B IN

Sl. No.	Parameter	Requirement
1.	Frequency Range	Receive 1030 ± 0.01 MHz Transmit 1090 ± 3 MHz
2.	Nominal Operating Voltage	28V DC
3.	Self-Test	Self-test function to permit self-test before flight
4.	Certification	FAA/EASA TSO for installation as per FAR Part 23 (Amdt. 23-64) Class IV Airplane. Compliance needs to be according to Appendix A.
5.	Environmental Compliance	According to the applicable levels in DO-160 Compliance need to be according to section 4.2.3.

4.2.6.5 MODE S Transponder with 1090 ADS-B IN/ OUT

Mode-S/ADS-B Transponder supplies surveillance functions to both ground-based and airborne interrogators and communication functions to onboard systems. The transponder replies to Air Traffic Controller's (ATC) Secondary Surveillance Radar (SSR) with Mode 3/A (aircraft identification or 4096 code) and Mode C (barometric altitude reporting). The transponder also contains Mode S specific transmissions, which are selective interrogations and replies directly to onboard systems with a unique 24-bit code (Mode S address) assigned to each aircraft.

The Transponder with Automatic Dependent Surveillance-Broadcast (ADS-B) "OUT" facility shall support it using the Mode S DF17 Extended Squitter. This is a function for airborne and surface aircraft which transmits horizontal and vertical position and velocity as well as other pertinent surveillance information. Transponder will automatically transmit DF17 information based on onboard navigation sensors with or without an interrogation from a ground station or aircraft.

4.2.6.5.1 General System Requirements

In addition to complying to the "Minimum Operational Performance Standards for Air Traffic Control Radar Beacon System/Mode Select (ATCRBS/Mode S) Airborne Equipment", "Minimum Operational Performance Standards for 1090 MHz Automatic Dependent Surveillance - Broadcast (ADS-B), Traffic Information Services (TIS-B)" spelled out in the applicable TSOs for Mode S transponder and 1090 ADS B In and out, the offered Mode S transponder (with ADS B system) must also comply to the below requirements:

Sl. No.	Parameter	Requirement
1.	Frequency Range	Transmit 1090 MHz Receive 1030 MHz
2.	Power requirement	28 VDC Nominal
3.	Operating modes	Standby, Altitude reporting ON/OFF
4.	Self-Test	Self-test function to permit self-test before flight
5.	Certification	FAA/EASA TSO for installation as per FAR Part 23 (Amdt. 23-64) Class IV Airplane. Compliance needs to be according to Appendix A.
6.	Environmental Compliance	According to the applicable levels in DO-160 Compliance need to be according to section 4.2.3.

ADS-B IN and OUT requirements are mandatory and shall be included as standard delivery with required Mode S transponders.

4.2.6.6 Display Suite

4.2.6.6.1 System Architecture

The architecture for DISPLAY SUITE consists as follows.

4.2.6.6.1.1 Primary Flight Display (PFD) and Multi-Function Display (MFD)

- A. Quantity 04 Numbers of Multi-Function Displays (MFD) shall be utilized.
- B. All the Displays shall either have an active display area of minimum 6" x 8" (+/- 5%) - portrait format or Landscape format wherein four displays shall be installed or the bigger displays up to active display area size of 8" x 12" (+/- 5%) (Landscape format) may also be offered wherein four such displays shall be installed. A combination of both the sizes may also be offered meeting the minimum requirements.
- C. All MFDs shall be interchangeable in form, fit & function. If difficult it shall be mandatory for PFD and MFD if not across PFD and MFD.
- D. Displays shall be clearly readable from the pilot / co-pilot stations under all ambient light conditions. Also, the Symbolology shall be swappable across pilot and Co-pilot by a selection on the display (PFD of Co-Pilot shall be able to change Symbolology on Pilot display on demand by Pilot and vice-versa).
- E. Altimeter settings, Altitude bug settings, Course selection, heading bug setting, Decision Height setting and other settings shall be selectable through MFDs bezel/soft mounted controls or separate MFD control panels may also be provided.
- F. MFDs shall have in-built symbol/format generation capability.
- G. Signal acquisition from interfaced systems and their conversion capability to be available either within the displays or this facility may stay outside the displays.
- H. Two MFDs will work in Primary Flight Display (PFD) mode, one on each pilot & co-pilot side, under normal operating conditions.
- I. One/Two out of the balance will work in Multi-Function Display (MFD) mode and in Engine Indicating and Crew Alerting System (EICAS) mode under normal operating conditions on selection/configuration.
- J. Primary Flight Display (PFD): Displays in PFD mode shall provide the crew with all necessary flight, navigation, auto-pilot and systems' status information. PFD mode shall provide the crew with following information:
 - a) All necessary Primary flight information e.g. Attitude Indicator (ADI), Airspeed Tape, Altitude Tape, Vertical speed indicator, Turn Co-ordination, Rate of Turn Indicator and FAST/SLOW indication etc.
 - b) All necessary navigation information in conventional 360° HSI, ARC HSI, 360° MAP, ARC MAP etc. format
 - c) Flight guidance, the autopilot and yaw damper status annunciations, FMS information, Radio Altitude indication, primary and secondary navigation source data, primary and secondary bearing source data, lateral and vertical deviation scales, marker beacon annunciations, lateral and vertical mode annunciations etc.
 - d) Terrain mode annunciations, warning/caution annunciations etc.
 - e) In case of EICAS display failure, reversionary modes shall be activated through minimum key selection to display the EICAS information on PFD.
 - f) Revisionary mode shall be provided and at any given point of time one PFD displaysymbology shall be available to pilot. Reduced EICAS information shall be available in PFD page in worst case whereas single display is available.

- g) The PFDs shall have the capability to allow pilots to select the source for display depending on the availability of the sensors like AHRS, ADC, VOR etc so that in case of failure of one of the sensors the pilot can manually select the available source. The output of the selected source shall also be made available to other avionics equipment like autopilot, SWS etc so that they use the same signals that are being displayed on the PFD. The display shall also indicate the selected source on the screen.
 - h) PFD shall provide the following parameters as output in ARINC 429 but, not limited to
 - ADC/AHRS/NAV source selection,
 - Miscompare information for Pitch, Roll, Yaw, Altitude, HDG, LOC, ILS, GS, RA, Airspeed, SYNCH, etc.,
 - PFD/MFD modes of operation with active pages
 - BIT and Health Information
- K. Multi-Function Display (MFD) MODE: MFD mode shall provide the crew with following information:
- a) Centered airplane symbol, Heading/course information, flight plan and waypoint information and depiction, primary and secondary navigation source data, primary and secondary bearing source data, current magnetic heading and heading bug, True Airspeed and Ground speed display etc.
 - b) Terrain mode annunciations, graphical information from TCAS with ADS B IN, TAWS and Weather Radar.
 - c) In case of PFD mode display failure, reversionary modes shall be activated through minimum key selection to display the PFD information on EICAS/MFD displays.
 - d) MFD/PFD controller shall be provided if applicable for each unit or for set of units as applicable.

4.2.6.6.1.2 Engine Indication and Crew Alerting System (EICAS) MODE: EICAS mode shall provide the crew with following information:

- a) EICAS shall interface with the relevant aircraft systems to display Engine parameters as per requirements of FAR 23 Commuter category Aircraft. Final list will be provided to Supplier at placement of PO.
- b) Crew alerting warnings & cautions from on-board systems.
- c) Monitors the operation of various systems in aircraft (e.g., CVR, DC generation system, fire protection, flaps, fuel level, FDR etc.) and gives visual and/or acoustic alert messages (warning, caution and status messages) of failures displayed on EICAS.
- d) Fully colored text, numbers, meter gauges and other animated displays shall be provided, in a full-page display under normal conditions and part page display under reversionary conditions.

4.2.6.6.2 Customization Tool for Avionics Display Application modification by user

Customization of the Avionics Display application has two modes

Mode A: Supplier Provided Tool to mechanism to modify and re-certify the Symbology in India with Indian certification authorities.

Supplier shall provide a tool using which user shall modify the Symbology and update. However, these modifications shall not attract re-certification (for those Symbology modified by the tool) as the tool shall be qualified to do modifications without re-certification activity. However, CSIR NAL shall re-certify the complete system by carrying out the functional testing as per top level requirement. Supplier shall provide evidences for the tool qualification and support for the system certification in India with Indian certification agency.

Flexibility and Customization tool for Display Pages

- a. Customizable software tool is required from Supplier which allows access to authorized customers to change certain aspects of the product, such as the display of EICAS (Engine Indication and Crew Alerting System).
- b. Tool is required to configure dynamic shapes and text. It needs to allow for definable position, color, size, rotation, motion, conditions and selection. It features 10 dedicated pages plus five de-clutterable overlays for most display functions, with 512 elements per page or overlay. When designed, these shapes and texts to create an ideal display page for the requirement.
- c. Tool also be able to have dynamically definable menus/sub-menus and screen status, with a fixed EICAS screen position option.

- d. Additionally, with tool, an open-architecture ground maintenance function and flight configuration or a ground maintenance configuration should be possible to design if required.
- A. Additional Tool Details

For overlays, each overlay element can be rendered full-time or tied to a declutter menu in the affected page. It is required to have five overlays adding option to the following pages:

 - a. Normal PFD (pilot and co-pilot can be different)
 - b. Basic PFD (pilot and co-pilot can be different)
 - c. Navigation Display
 - d. Traffic Display
 - e. Data link Display
 - f. Hover Display
 - g. WX/SAR Radar Display
 - h. Video 1, 2, 3, 4, 5
 - i. There are also externally assignable menus.
 - j. Movable and rotatable elements in displays, including the following:
 - k. X/Y Pixel Location from external source
 - l. Direction/Pixel location from external source
 - m. Lat/Lon/Alt location from external source (perspective rendering on PFD)
 - n. Direction/Distance/Alt location from external source (perspective rendering on PFD)
 - o. Lat/Lon/Alt Element can be OASIS waypoint (with name)
 - p. Clock element
 - q. SDI Segregation (memory analysis)
 - r. Configurable DDW outputs
 - s. Bitmap support
 - t. Object select with receive and send action
 - u. Additional Tool Details

Mode B: Supplier Provided Access to modify and re-certify the Symbolology in India with Indian certification authorities.

Supplier is required to provide capability in the Display Suite to customize Display pages like Navigation Display, Multi-Function Displays. The access mechanism (a separate time and memory partitioned) needs to have the capability to take the data interfaced to Display suite and generate at least Display application pages comprising Engine Indication, Fuel System, Electrical Synoptic, Hydraulics Synoptic, Airframe Synoptic, landing Gear Synoptic, Environmental Synoptic.

However, the complete System TSO shall not be impacted with the updation of the CSIR NAL software application.

Once User (NAL) carries out the modifications, the re-certification activity will be taken care by NAL with Indian Certification agency with help from Supplier. Supplier shall provide the required documentation to the certification agency (Not the design IP) along with the technical support.

4.2.6.6.3 **Supplier Eyebrow Panel**

- A. Eyebrow panel (s) suitably mountable on the top portion of the MIP should be provided to set the following parameters in head-up manner:
 - a) Course selection
 - b) Heading bug setting
 - c) Altitude Preselect setting

4.2.6.6.4 **Integrated Standby Instrument System (ISIS)**

- A. An Integrated Standby Instrument System (ISIS) shall be provided by the Supplier to provide critical information to the flight crew in total display failure condition as a stand-by instrument.
- B. Integrated Standby Instrument System (ISIS) shall display the following minimum information:
 - a) Independent Pitch & Roll Attitude,
 - b) Airspeed,
 - c) Baro-altitude, and
 - d) Aircraft heading angle

- C. The ISIS display shall be with sufficient area to display necessary information.
- D. The ISIS display shall be backed by a flux valve. Other options if any may be proposed.
- E. The ISIS shall be controlled by soft keys or buttons/switches on its bezel.
- F. The ISIS shall have at least 60 minutes independent battery backup to ensure continued functioning during total electrical failure
- G. It would be preferable if the outputs of the ISIS are made available in standard ARINC 429 format for use by other systems in case it is required.
- H. supply one set of Pitot tube (1 count), Static port (2count), TAT (1 count if required) sensors for Standby Instrument.

4.2.6.6.5 Data Upload and Download Facility

- A. Suitable Data Transfer Unit (DTU) shall be provided to load navigation database and pilot defined data to the FMS and also to load terrain and other database updates to the TAWS/Synthetic Vision System/Map and Chart Generation System. It will also be used to download in-flight parameters, maintenance log diagnostic display, and other aircraft configuration data from the FMS and TAWS.
- B. Both Hardware as well as Software of the Data Transfer Unit shall be provided. Preferred interface shall be either Ethernet or USB.
- C. AHRS in-situ calibration software tool and interface
- D. Any other LRU which requires software/configuration updates, shall be provided with the feature to interface for download/upload with relevant software application/tool. Such tool shall be provided as part of the system.
- E. Supplier shall provide the system for Wired as well as Wireless mode of data upload for Flight Planning / route planning using an offline planned flight plan in the wireless device. However, such device shall also have capability to connect with wired interface. Accordingly, in either case, the on-board system shall support to interface in wired or wireless mode.
- F. MFD/PFD or any other device (which is responsible for hosting the emergency checklists) shall have the provision to upload the OEM Emergency checklist for SARAS Specific requirement by aircraft OEM using the Upload utility provided by LRU OEM and this process of OEM uploading the Emergency Checklists shall not impact the certification status of the LRU.

4.2.6.6.6 Synthetic Vision System

- A. Synthetic vision system shall provide high-resolution terrain database to provide the pilot a perspective as if looking out of the flight deck window.
- B. The system shall maintain the standard foreground symbology and shall replace the blue/brown background with imagery depicting the terrain in real-time complete with pitch and roll orientation.
- C. Synthetic vision output shall be displayed on MFDs with overlay of flight plan from the FMS, deviation indicators, trend vectors and compass symbol with course and heading information.

4.2.6.6.7 Maps and Charts

- A. Map and Chart system shall provide terminal charts (airport, departure, arrival and approach) and associated NOTAMs to the pilot's display.
- B. Pilots shall be able to create their aircraft specific procedural checklists for normal, abnormal and emergency situations.

4.2.6.7 Engine and Airframe Interface Units

CSIR-NAL is custom designing a system with following functionalities Utility System and Management System (USMS), Stall warning system (SWS), Brake Management System (BMS) and Central Maintenance Computer (CMC). This system shall interface different aircraft sub-systems with the avionics suite.

To facilitate this, the supplier shall provide the complete ICD, signal definitions, connector pin designations, complete input/output signal details of each LRU of proposed suite.

4.2.6.8 Solid State Flight Data Recorder (SSFDR)

4.2.6.8.1 GENERAL SPECIFICATIONS:

- a. NAL SARAS MKII aircraft shall be equipped with a SSFDR system. The SSFDR shall record required parameters to determine accurately the aero plane flight path, speed, attitude, engine power, configuration and operation.

- b. The offered system shall comply with the "Minimum Operational Performance Standards for Solid State Flight Data Recorder System" spelled out in the applicable TSO for the SSFDR system.
- c. The offered SSFDR system shall have any of the following option:
 - i. SSFDR with a separate Data Acquisition Unit.
Supplier shall provide technical details of each of the LRU offered. NAL shall provide data definition of required parameters to be recorded in flight data recorder. Vendor shall take responsibility to customize the flight data recorder to acquire and record as per NAL requirement.
- d. The Flight data recorder shall be capable of retaining the information recorded during at least the last 25 hours of its operation. It should be compliant to ICAO std Annex 6 & 13 and crashworthiness standard TSO-C 124c.
- e. The offered SSFDR shall be based on solid state technology and shall utilize solid-state memory. Any other type of FDR like engraving metal foil FDRs, analogue FDRs using frequency modulation (FM), photographic film FDRs, magnetic tape FDRs shall not be accepted.
- f. The containers of the offered flight recorders shall be painted a distinctive orange colour, carry reflective material to facilitate their location; and shall have securely attached an automatically activated underwater locating device. Such device shall be operating at a frequency of 37.5 kHz, and shall operate for a minimum of 90 days.
- g. Means shall be provided for an accurate time correlation between the flight recorder systems recordings.
- h. The Supplier shall provide the Manufacturer's operating instructions, equipment limitations and installation procedures; parameter origin or source and equations which relate counts to units of measurement; and manufacturer's test reports.
- i. The flight recorders shall start to record prior to the aircraft moving under its own power and record continuously until the termination of the flight when the aircraft is no longer capable of moving under its own power.
- j. A consolidated list of all the offered LRUs/Items/Mating connectors/Test equipment (GRE: software and hardware other than standard Laptop or PC) including details of hardware and software (if separate part number) with part numbers shall be provided by the Supplier. List of all associated documentation shall also be included in the technical offer.
- k. The readout facility shall have the necessary software to accurately convert the recorded values to engineering units and to determine the status of discrete signals
- l. Flight recorders shall be constructed, located and installed so as to provide maximum practical protection for the recordings in order that the recorded information may be preserved, recovered and transcribed. Flight recorders shall meet the prescribed crashworthiness and fire protection specifications. Compliance of Crashworthiness and fire protection specification shall be provided by the Supplier with an Environmental Qualification Forms (EQFs) for all the system units.
- m. Supplier shall provide all the details of the system with respect to interfacing of various aircraft systems with suitable diagram, schematics, picture and/or supporting document.
- n. Supplier Shall provide the details of the data protocol recorded in the FDR, so that NAL can decode the recorded data using any software.

4.2.6.8.2 Flight recorder electronic documentation:

It is recommended that the documentation requirement concerning FDR parameters provided by operators to accident investigation authorities should be in electronic format and take account of industry specifications. Industry specification for documentation concerning flight recorder parameters may be found in the ARINC 647A, Flight Recorder Electronic Documentation, or equivalent document. Supplier shall provide details to comply this requirement.

4.2.6.8.3 Parameters to be recorded:

The parameters that satisfy the requirements for SSFDRs are listed in the following paragraphs. The number of parameters to be recorded shall depend on aeroplane complexity. The recorder shall have provision to configure the WPS from 64 to 1024 WPS with standards SYNC words (The detailed list of parameters shall be provided to the selected Supplier).

4.2.6.9

Solid State Cockpit Voice Recorder (SSCVR)

- a. NAL SARAS MKII aircraft shall be equipped with a SSCVR system. The CVR function shall be capable of retaining the information recorded during at least the last two hours of its operation.
- b. The offered system shall comply with the "Minimum Operational Performance Standards for Solid State Cockpit Voice Recorder System" spelled out in the applicable TSO for the SSCVR system. It should be complaint to crashworthiness standard TSO-C 123c.
- c. The CVR function shall be capable of recording - on at least four channels simultaneously. The preferred channel allocation shall be as follows:
Channel 1 —co-pilot headphones and live boom microphone
Channel 2 —pilot headphones and live boom microphone
Channel 3 —area microphone
Channel-4— (Aero plane) — time reference plus the third and fourth crew members' headphone and live microphone, if applicable.
- d. The containers of the offered flight recorders shall be painted a distinctive orange colour, carry reflective material to facilitate their location; and have securely attached an automatically activated underwater locating device, such device shall be operating at a frequency of 37.5 kHz, and shall operate for a minimum of 90 days.
- e. The Supplier shall provide the Manufacturer's operating instructions, equipment limitations and installation procedures; and manufacturer's test reports.
- f. The CVR shall be constructed, located and installed so as to provide maximum practical protection for the recordings in order that the recorded information may be preserved, recovered and transcribed. Flight recorders shall meet the prescribed crashworthiness and fire protection specifications. Compliance of Crashworthiness and fire protection specification shall be provided by the Supplier with an Environmental Qualification Forms (EQFs) for all the system units.
- g. A consolidated list of all the offered LRUs/Items/Mating connectors/Test equipment (GRE: software and hardware other than standard Laptop/PC) including details of hardware and software (if separate part number) with part numbers shall be provided by the Supplier. List of all associated documentation shall also be included in the technical offer.
- h. Supplier shall provide all the details of the system with respect to interfacing of various aircraft systems with suitable diagram, schematics, picture and/or supporting document.

4.2.6.10

Autopilot (Cat II Compliant)

A compatible autopilot for CAT II operations needs to be proposed along with the avionics suite specifications described in section 4.3.

Note:

Autopilot related BOM (including both RE, NRE, deliverables and any other dependent accessories / items) shall be quoted for CAT II without linking it with avionics suite. NAL reserves the right to place PO on both Avionics and AP suite or only Avionics suite CAT II at the time of placing PO with the selected L1 Supplier.

Specifications for CAT II Autopilot

Autopilot System for FAR 23 category Aircraft meeting the CAT-II approach & landing requirements as per AC 120-29A. The proposed system shall include

- a. Auto-flight and Flight Guidance computers to provide computation of flight guidance commands and FD display, Autopilot tracking of flight guidance commands and pitch auto-trim functionality
- b. AP/FD Modes (Desirable list of modes given below)

Flight Director Modes	Definition
PAH	Provides guidance to maintain a pilot selected pitch attitude reference
ALT	Provides guidance to maintain a barometric altitude reference
ALTSEL	Provides guidance to capture and level off at a pre-selected altitude
SPD	Provides guidance to track a pilot selected speed reference
VS	Provides guidance to track a pilot selected vertical speed reference
VNAV	Provides vertical guidance to track a pilot selected Navigation source
RAH	Provides guidance to maintain a pilot selected roll attitude reference

HDG	Provides guidance to capture and track a pilot selected heading reference
HNAV	Provides lateral guidance to track a pilot selected Navigation source
NAV (ILS, VOR, LOC, GS)	Provides guidance to capture and track the ILS/VOR/LOC/GS signal
BC	Provides guidance to capture and track the back course localizer signal
APPR	Provides guidance to capture and track the front course localizer signal and glide slope signal

- c. Envelope Protection features (like low-speed warning, high speed warnings, etc.,)
- d. Stand-alone Yaw Damper functionality should be available
- e. Integration with the offered Display units (Mode Annunciation, Flight Guidance bars, associated AP/FD Warnings about the AP/FD availability and/or limitations, Mistrim warnings, Trim Runaway, Trim Failures)
- f. Compatible Autopilot Mode Select Panel
- g. Compatible Central Pedestal Turn controller (if the proposed architecture has this feature)
- h. 3 Autopilot smart Servos (for 3 axis control) & 2 pitch trim servos (for automatic Pitch Trim) with mechanical interface to mechanical primary flight control system.
- i. Manual Override Feature: AP should get disengaged when a significant override force is applied to the controls by the pilots. Significant force to be interpreted as a force that is consistent with an intention to overpower the autopilot. The autopilot should not disengage by minor application of force to the controls, such as pilot gently bumping the controls while entering or exiting a pilot seat during cruise.
- j. Supplier shall provide the technical support for Integration of proposed AP system in the CSIR NAL 6DOF and Iron Bird. Control wheel switches inputs shall be available to the AP system.

Input signal requirements for NALs indigenous system as tabulated in Appendix D

4.2.6.11 Inertial Reference System (IRS)

Inertial reference system is a navigation aid which provides estimated coordinates by calculating the acceleration sensors data, angular velocities and reference coordinates.

The IRS consists of 3-axis gyroscopes which gives the system computer the roll, pitch and yaw rates about the body axes It also consists of 3-axis accelerometers which gives the accelerations along the axes. There are two basic inertial mechanisms which are used to derive the Euler angles from the rate gyros,

IRS systems will be used as a navigation aid in case of absence of GPS system or in parallel with GPS navigation aid for highest accuracy.

" Avionics suite shall be integrated with either AHRS-AHRS or IRS-AHRS configuration and therefore the architecture shall support the interfaces and functionality without changing the architecture."

4.2.6.11.1 General System Requirements

In addition to complying to the "Minimum Operational Performance Standards for IRS spelled out in the applicable standard listed in the applicable TSO for the IRS system, the offered IRS system must also comply to the below requirements:

The IRS parameters shall be complaint to ARINC 429 DITS reference or equivalent digital bus with updates rates of minimum 40 Hz.

Sl. No	Parameter	Requirement
1.	Nominal Operating Voltage	28 V DC
2.	IRS Control	IRS system may be connected with dedicated control panel or part of MFD to input reference and other required data
3.	Certification	FAA/EASA TSO for installation as per FAR Part 23 (Amdt. 23-64) Class IV Airplane. Compliance needs to be according to Appendix A.
4.	Environmental Compliance	According to the applicable levels in DO-160 Compliance need to be according to section 4.2.3.

4.3 AIRCRAFT INFORMATION

SARAS Mk2 aircraft systems will be comparable to current industry standards which will include a full-glass digital cockpit and power assisted control systems where necessary.

4.3.1 General Description

The aircraft is designed for a commuter role, with a seating capacity of up to 19, propelled by twin turbo prop engines. The aircraft is to be certified under FAR 23 certification procedures. The aircraft is required to have high reliability, contemporary systems, modern design concepts and state-of-the-art technology. The components/systems should be preferably generic (not specific to type) and should be off the shelf items, unless absolutely necessary to involve major LRU development. Envisaged roles of the aircraft are Personnel Transport, Training of pilots and Casualty Evacuation.

4.3.2 Operating Conditions

Capable of operating from high airport elevations (~ up to 1100 ft airfield elevation) under high temperature (ISA+20 °C) and high humidity conditions of close to 60 %.

Indian Reference Atmosphere (IRA) to be the bench mark for aircraft performance (ISA+15 °C for up and away flight and ISA+20 °C for Field performance).

Aircraft to be capable of prolonged operation in the prevalent hot and cold conditions, ambient temperature of -40 deg C to +55 deg C, dusty conditions of arid zones and humid/saline atmosphere of coastal regions. For updated environmental qualification requirement please refer **Appendix E**.

4.3.3 Certification

Certification basis will be as per FAR Part 23 (Amdt. 23-64) Class IV Airplane including day, night, VFR (Visual Flight Rules) IFR (Instrument Flight Rules) and flight into known icing conditions. SARAS Mk II falls under certification Class IV and 'low speed' performance level.

4.4 TECHNICAL REQUIREMENTS

- Technical specifications of the Avionics Suite are provided in this RFP. It includes avionics suite's technical specifications and relevant technical information of the CSIR-NAL SARASMK II aircraft.
- Supplier provided Major Equipment / LRUs of the avionics suite shall already be approved under Technical Standard Order (TSO) system. All the equipment shall be of contemporary design using state of the art technology and advanced built-in test/diagnostic capabilities.
- Technical bid shall include a detailed proposal with model and part number for each of the LRU's with clear mention of the TSO/certification data for hardware / software including qualification specifications. Technical bid shall provide a detailed avionics architecture based on the systems proposed along with MTBF of each of the LRUs.
- While proposing the LRUs and hence the architecture, Supplier shall ensure that the failure rates of complete avionics suite shall not be less than 10 E-7 for events
 - Loss of Communication.
 - Loss of Navigation and
 - Loss of Primary Flight Display

- e) Supplier shall ensure the compatibility of all the LRUs proposed for all avionics systems
- f) Supplier shall propose the LRUs to ensure that the proposed model and part number is available for supply/service for a minimum period of 20 years
- g) Supplier shall accept to sign a Pricing Agreement for 10 Years after the supply of first shipment indicating the annual escalation costs for a period of 10 years on grant of Purchase Order.
- h) All systems being supplied need to include necessary components like installation and maintenance manuals with wiring diagrams/pin outs of each connector, recommended wiring practices like wire gage, shielding termination, mounting brackets, trays, kits, clamps, mating connectors with back shells (strain relief) and including Antennas with appropriate mating connectors to enable full system functionality.
- i) The delivery package shall also contain necessary airworthiness documents to be submitted to the certification agencies.

4.4.1

SARAS Mk II aircraft specific customization and configuration

Generally, the following requires the aircraft specific customization in avionics suite

- a) MFD page customization for the Synoptic pages, Utility systems, Engine Indication and crew alerts etc.
 - For MFD synoptic/symbology design, develop, certify, vendor shall provide required peripheral APIs to (but not limited to):
 - Read all Inputs and to Write all outputs,
 - Symbology generation,
 - Standard Widgets for Symbology generation if available shall be provided,
 - To trigger the Project specific (SARAS MKII) CAS messages as part of the MFD, supplier shall provide required MFD applications, tools and API.
- b) Data concentrator for the airframe and engine interfaces (NAL shall take care of the same)
- c) Audio Warning System (AWS) for custom warning other than standard synthesised audios. Supplier shall provide mechanism for User to load the synthesised digital audio files to the AWS without effecting the cert and qual.

4.4.1.1

MFD page customization for the Synoptic pages, Utility systems, Engine Indication and crew alerts

It is envisaged that the following information need to be customised in MFD for SARAS Mk II aircraft specific requirement

- a. Engine Indication and Crew Alert parameters including alerts with ITT, Propeller RPM, Generator RPM, Oil Pressure, Oil Temperature, Torque.
- b. Design and implementation of synoptic pages for including the required logic;
 - i. Electrical System - Half page
 - ii. Hydraulics System with Wheels and brakes - Half page
 - iii. ECS and CPCS - Half Page
 - iv. Primary Flight Controls - Half Page
 - v. Fuel System - Half Page
 - vi. Life Support System - Quarter page
 - vii. Fire System - Quarter page
 - viii. Others - 1 page

4.4.1.2

Data Concentrator for Airframe and Engine Interfaces

The Data Concentrator System for Airframe and Engine Interfaces will be developed by CSIR NAL. Supplier to indicate the necessary format and protocol architecture dependency if any in order to realise the proposed Avionics Architecture for this Aircraft. Refer section 4.2.6.7.

4.4.1.3

Audio Warning Systems

Supplier shall provide the standard COTS Audio Warning Generators coupled with the Audio Management System (AMS). However, as part of flight testing, CSIR NAL would like to add few more audio warnings and hence the Audio warning System shall be able to accommodate additional around 10 audio warnings apart from the mandate list shown below;

List of minimum mandate Audio Warnings

1. Engine Fire
2. Lavatory Smoke
3. Battery Discharge
4. Stall
5. Abort Take off
6. Altimeter Setting
7. Speed Limit
8. Landing Gear
9. Pitch Trim

Supplier shall provide mechanism for User to load the synthesized digital audio files to the AWS without effecting the cert and qual.

If the proposed system of Audio warning System by Supplier has the mechanism and capacity to accommodate additional user defined audio warnings (preferably in jpg audio format), then the NRE for this activity is not required to be quoted in the commercial bid

4.4.1.4 Configuration of complete avionics suite (Cat II) for SARAS Mk II aircraft compliant to FAR 23

Supplier shall propose the systems as detailed in this RFP as per the compliance to fulfil the FAR 23 regulations apart from functional requirements as stated in this RFP.

Supplier shall ensure that the individual systems proposed by Supplier is compatible with each other as per the requirements in terms of electrical, protocol, parameters and connectivity.

If Supplier feels that this activity requires a separate NRE apart from the supply of LRUs, the same shall be quoted in commercial bid.

4.5 WORK SHARE AND RESPONSIBILITY

The work shares and major responsibilities of the Supplier as well as CSIR-NAL for this project are given as below:

Sl.No	Activity description	Primary	Secondary
01	Architecture definition	Supplier	CSIR NAL
02	Wiring interconnection design (Theoretical diagram)	NAL	Supplier
03	Ground Integration	NAL	Supplier
04	Aircraft Integration	NAL	Supplier
05	Flight Testing	NAL	Supplier
06	Compliance artefact compilation and submission as part of avionics suite certification clearance from CEMILAC/DGCA	NAL	Supplier However, Suppliershall provide the required artefacts as required for the regulatory agency for airworthiness requirement as per section 4.7(b)
07	Airframe and Engine Interface Unit	NAL	Supplier Supplier shall provide the protocol, ICD details of the systems which will be connecting the Airframe and Engine Interface Unit

4.5.1 SUPPLIER'S WORK SHARE/RESPONSIBILITY:

Supplier's Work Share and responsibilities in brief are detailed in section 4.5.2. In addition, the following tasks are identified;

- a) To supply Three (03) [costing to be in the batch of 1-5] sets of complete avionics suites along with necessary interface/ associated equipment and aircraft installation kits like fasteners, mounting trays, mating connectors, backshell, Strain relief, special cables (if any) along with antennas. To provide the itemized list of deliverables along with part nos. and quantities for each deliverable. Details given in section 4.9.

- b) On request, Supplier shall provide on-site/off-site technical assistance/support during wiring interface design, ground integration, aircraft integration and flight tests. Supplier to provide quote for Five (5) working days (Monday to Friday) of technical support as part of RFP. Multiples of these support instances may be called on requirement. Details given in section 4.8
- c) To provide documentation as specified at section 4.7
- d) To provide training to NAL ground crew and flight test crew on the operating procedures of the avionics suite.
- e) Supplier to supply all the required /compatible antenna. If Supplier is not supplying the antenna, then Supplier shall get the recommendation of the Supplier and supply the recommended antenna to CSIR NAL.
- f) Supplier to supply all the artifacts for operation, maintenance, servicing, certification and airworthiness for all the deliverables.
- g) Technical support in terms of technical information, technical queries through email, fax, telecom and Video Conferencing, WebEx, Skype etc., during the preparation of Electrical interconnection drawings, Grounding and shielding scheme for full suite, Mechanical installation drawings, Ground integration and Aircraft integration and Pre-Installation testing support
- h) Technical assistance for system configuration/setup on Ground as well as aircraft.

4.5.2 NAL'S WORK SHARE/RESPONSIBILITY:

NAL's responsibility in brief is detailed in section 4.5. In addition, the following tasks are identified;

- a) To conduct the Preliminary Design Review (PDR) meeting at NAL.
- b) To conduct the Critical Design Review (CDR) meeting at NAL.
- c) To co-ordinate with Indian Airworthiness Agency, CEMILAC/DGCA, for certification of complete avionics suite in coordination and support from Supplier.

4.6 TRAINING

- a) Supplier shall provide Training documents, multi-media presentations, and other training aids.
- b) Comprehensive training of 10 working days for NAL engineers, ground crew and flight test crew shall be imparted by the Supplier to cater for the training needs covering installation, operation, calibration (if applicable) and maintenance. Training sessions shall accommodate 35 trainees and shall be imparted at CSIR NAL BANGALORE with training material.
- c) If the proposal consists of any special software for customization by user, Then User shall be trained separately for a minimum period of 05 working days at CSIR NAL.

4.7 DOCUMENTATION (After PO)

Supplier shall provide documentation for all the systems of avionics suite which will be installed and certified on SARAS-MK2 aircraft. Soft copies of all the documents shall also be provided in CD/DVD. The broad categories of the documents and technical publications are as under:

- a) Manuals of individual avionic LRUs.
 - i. Specification Manual
 - ii. Maintenance Manual
 - iii. Installation Manual with complete kit
 - iv. Operating Manual
 - v. Pilots Guide (wherever applicable specially for displays)
 - vi. Calibration procedure mentioning the calibration periodicity if ON CONDITION is not applicable.
 - vii. Interface Control Document (Pin assignments, Protocol definition, Parameter definition, update rate, etc.)
 - viii. Electrical interfaces manual
 - ix. Mechanical interfaces manual
 - x. G/O, 28V/O and Analog interfaces to the International Standards and Interface manuals

- xi. Recommended Electrical Wiring Diagrams with gauge, type of cable, grounding scheme, bonding scheme, special recommendation specific to the LRU.
 - xii. Weight and C.G. reports for each of the LRU
 - xiii. ATP report
 - xiv. LRUs MTBF and system reliability (FTA, FHA, FMEA, PSSA or SSA) associated report of the architecture.
 - xv. 3D CAD Model (CATIA or solid works) covering all LRU's envelop to be provided to work on the LRU installation on airframe. This will help NAL to optimize the space and location of the LRU on the aircraft.
- b) Airworthiness documents/artefacts for each LRU
- i. FAA/EASA/DGCA approval artefacts FAA 8130-3/EASA Equivalent/DGCA equivalent with model and serial number of specific deliveries
 - ii. TSO approval copy
 - iii. COCs (Certificate of Conformance) (only if TSO is not applicable for auxiliary systems)
 - iv. Airworthiness Tag
 - v. Qualification test Report
- c) Pre-Dispatch Test Reports
- d) Recommended Spares Part List (RSPL)
- e) Each LRU will have a tag of SW version and DAL level if applicable.

4.7.1 BID DOCUMENTATION

Supplier shall provide documentation for all the systems of avionics suite which will be offered for SARAS-MK2 aircraft. **Soft copies of all the documents shall be provided in CD/DVD as part of technical bid.** The broad categories of the documents and technical publications to be submitted are as under:

- a) Manuals of individual avionic LRUs.
 - i. Specification Manual
 - ii. Operating Manual
 - iii. Pilots Guide (wherever applicable specially for displays)
 - iv. Weight and C.G. reports for each of the LRU
- b) Airworthiness documents/artefacts for each LRU and Antennas
 - i. FAA/EASA/DGCA approval artefacts FAA 8130-3/EASA Equivalent/DGCA equivalent status with model and serial number of specific deliveries
 - ii. TSO approval copy
 - iii. COCs (Certificate of Conformance).
 - iv. For Each LRU of Avionics Suite, supplier shall provide documents stating clearly TSO'd. However, supplier shall provide the TSO deviation / incomplete TSO / Non-TSO functional list if any in each LRU.
- c) Weight, Power, Volume, MTBF, TSO compliance Analysis Report as per **Appendix B**
- d) Supplier will submit a detailed Weight, Power, Volume MTBF, TSO compliance Analysis Report as per **Appendix B** for the Avionics suite offered. Weight to include the weight of connectors, antennas and accessories.
- e) Antenna Radiation pattern measured values (Gain and Directivity for both polarizations).
- f) VSWR measurement Document for the entire frequency band.
- g) Axial ratio measurement values for the frequency band.

Failure to submit Technical Bid Documentation as indicated in this section will lead to disqualification of Technical Bid and further no eligibility for participation in Commercial Round. The correctness of the documentation submitted will be the Decision of Technical Evaluation committee. Technical Bid shall clearly spell out whether the supplier is providing the above documentation or not.

Note: Any document which is costed should be mentioned in the technical bid and the same shall be supplied part of the delivery.

4.8 TECHNICAL SUPPORT

Supplier shall provide the on-site and/or off-site technical support for SARAS Mk II Avionics integration wherever applicable as detailed below.

4.8.1 Supplier shall provide Off-site support for the following (hourly rate with validity of 5 years from date of purchase order. NAL may use such hourly rates on the need basis)

- a) Technical support in terms of technical information, technical queries through email, fax, telecom and Video Conferencing, WebEx, Skype etc., during the preparation of Electrical interconnection drawings, Grounding and shielding scheme for full suite, Mechanical installation drawings, Ground integration and Aircraft integration and Pre-Installation testing support
- b) Technical assistance for system configuration/setup on Ground as well as aircraft.

4.8.1.1 Service, repair support and warranty

Complete Avionics suite (all LRU's) shall be provided **3 Year warranty** from date of acceptance at NAL (maximum of 3 months) from date of receipt of the system at NAL.

- a) Supplier shall provide in writing commitment to support CSIR NAL for service and repair of supplied avionics LRUs and its accessories for a period of 20 years.
- b) Supplier may provide this support either by Supplier directly or Supplier authorized service Centers in India or abroad.
- c) Supplier will accept to sign an Annual Price Escalation Matrix Agreement as per acceptable International Standards for future deliveries of Avionics Suite for next 15 years. It is mandatory and Part of Acceptance Criteria
- d) For (a) and (b), Supplier shall obtain the written commitment and provide the same to CSIR NAL as part of the technical proposal.

4.9 LIST OF DELIVERABLES

Supplier shall provide the deliverables as per the table below. The supplier shall provide the shortest lead time for the delivery for phase wise delivery.

Sl.No	Description	Qty.	Reference	Remarks
01	Integrated Avionics Suite as per details given Section 4.2 (I) Phase I – 2 Sets Phase II – 1 Set only after written request from NAL	03 sets		
02	Autopilot with Actuators and Mode Select Panel as per details given in Section 4.2 (II) and compatible with proposed Avionics suite as per Section 4.2 (I)	03 sets		
03	IRS System as per details given in section 4.2 (III) and compatible with proposed Avionics suite as per Section 4.2 (I)	03 sets		
04	Tools and Software to Update the database configuration in LRUs ADCU, EGPWS/TAWS, FMS, AHRS during flight Tests including technical support.	01 set		
05	MFD page customization for the synoptic pages, utility systems, Engine Indication and crew alerts etc. As per section 4.2.6.6.	01 set		
06	Audio Warning Generator customization. As per section 4.4.1.3.	01 set		
07	Complete Avionics suite configuration for SARAS Mk II	01 set		
08	Complete Autopilot suite configuration (as per section 4.2.6.10)	01 set		
09	Mating connector for each of the LRU as per Appendix B	08 sets		
10	Mounting Kits (as per section 4.2 LRUs)	08 sets		
11	Documents/reports as per section 4.7	01 set		
12	Training (including training material) as per section 4.6	01 set		
13	Technical Support as per Section 4.8	01 set		

4.10 Inspection & Tests

4.10.1 General

- (i) The Supplier shall at its own expense and at no cost to the Purchaser carry out all such tests and/or inspections of the Goods and Related Services as are specified here. The Supplier shall at its own expense and at no cost to the NAL carry out all such tests and/or inspections of the Goods and Related Services as are specified in the chapter 4 or as discussed and agreed to during the course of finalization of contract.

- (ii) The inspections and tests may be conducted on the premises of the Supplier or its subcontractor(s), at the point of delivery and/or at the Goods final destination. If conducted on the premises of the Supplier or its subcontractor(s), all reasonable facilities and assistance, including access to drawings and production data - shall be furnished to the inspectors at no charge to the NAL.CSIR NAL shall bear the charges towards travel and accommodation of NAL team.
- (iii) Whenever the Supplier is ready to carry out any such test and inspection, it shall give a reasonable advance notice, including the place and time, to the Purchaser. The Supplier shall obtain from any relevant third party or manufacturer any necessary permission or consent to enable the Purchaser or its designated representative to attend the test and/or inspection.
- (iv) The NAL or its representative shall have the right to inspect and/or to test the Goods to confirm their conformity to the Contract specifications at no extra cost to the NAL and what inspections and tests the NAL requires and where they are to be conducted. The NAL shall notify the Supplier in writing in a timely manner of the identity of any representatives retained for these purposes.
- (v) Should any inspected or tested Goods fail to conform to the specifications, the purchaser may reject the goods and the Supplier shall either replace the rejected Goods or make alterations necessary to meet specification requirements free of cost to the Purchaser.
- (vi) The Purchaser's right to inspect, test and, where necessary, reject the Goods after the Goods' arrival at final destination shall in no way be limited or waived by reason of the Goods having previously been inspected, tested and passed by the Purchaser or its representative prior to the Goods shipment.
- (vii) The Supplier shall provide the Purchaser with a report of the results of any such test and/or inspection.
- (viii) With a view to ensure that claims on insurance companies, if any, are lodged in time, the Suppliers and /or the Indian agent, if any, shall be responsible for follow up with their Principals for ascertaining the dispatch details and informing the same to the Purchaser and he shall also liaise with the Purchaser to ascertain the arrival of the consignment after customs clearance so that immediately thereafter in his presence the consignment could be opened and the insurance claim be lodged, if required, without any loss of time. Any delay on the part of the Supplier/ Indian Agent would be viewed seriously and he shall be directly responsible for any loss sustained by the purchaser on the event of the delay.
- (ix) Before the goods and equipment are taken over by the Purchaser, the Supplier shall supply operation and maintenance Manuals together with Drawings of the goods and equipment built. These shall be in such details as will enable the Purchase to operate, maintain, adjust and repair all parts of the works as stated in the specifications.
- (x) The Manuals and Drawings shall be in the ruling language (English) and in such form and numbers as stated in the Contract.
- (xi) Unless and otherwise agreed, the goods and equipment shall not be considered to be completed for the purposes of taking over until such Manuals and Drawing have been supplied to the Purchaser.
- (xii) On successful completion of acceptability test, receipt of deliverables, etc. and after the Purchaser is satisfied with the working of the equipment, the acceptance certificate signed by the Supplier and the representative of the Purchaser will be issued. The date on which such certificate is signed shall be deemed to be the date of successful commissioning of the equipment. Acceptance certificate form as given in Annexure-I should be signed by authorized representative of Supplier&Purchaser.
- (xiii) Supplier shall be part of Ground integration/Acceptance Test activity at NAL

4.10.2 Manufacturer's Inspection Certificate

After the goods are manufactured and assembled, inspection and testing of the goods shall be carried out at the Supplier's plant by the Supplier, prior to shipment to check whether the goods are in conformity with the technical specifications. Manufacturer's test certificate with data sheet shall be issued to this effect and submitted along with the delivery documents.

4.11 Terms& Conditions

- a) Supplier shall prepare and timely submit its response to this RFP. All costs associated with the preparation & submission including cost of presentation for the purposes of clarification of the response shall be borne by the Supplier. NAL will in no case be responsible or liable for such costs, regardless of the conduct or outcome of the RFP process.

- b) Detailed terms and conditions of this RFP are given in the format enclosed as part of Tender document to this RFP. Supplier's confirmation on each of the clauses as complied / agreed to, is required to be furnished along with the proposal.
- c) NAL reserves the right to accept/ reject any and /or all responses received to this RFP without assigning any reasons thereof.
- d) Supplier shall provide the detailed breakup of equipment and part wise at the time of bidding, failing which the Commercial bid will be treated incomplete and rejected.

4.12

Milestones of the project

Supplier shall be participating in the milestone reviews. The milestone reviews are shown below.

Sl.No	Milestones Reviews/delivery
1	Requirements, Configuration and Architecture Review
2	Preliminary Design Review
3	Critical Design Review
4	Delivery of fully functional system First two sets (Phase I Delivery) (2 Sets) with Qualification of system with Associated cables/accessories
5	Flight Readiness Review
6	Second set (Phase II Delivery) (1 Set) is requested only after written request from NAL. Supplier shall indicate the shortest lead-time for the delivery. Max 3 years from Date of PO

4.13 Commercial format for offer of commercial bids
FAR 23 and CAT II compliant Avionics Suite with Autopilot Systems

Sl.No	Description	Total Qty	Currency					
Part I – RE Supply of Avionics Suite								
				Qty	Unit Price	Extended Price	Taxes/ Duties	Total (A5)
				(a)	(b)	(c)=(a)*(b)	(d)	(e)=(c) +(d)
a	Integrated Avionics Suite as per details given Section 4.2 (I) Complete set of Avionics LRUs along with necessary interface / associated equipment and aircraft installation kits including fasteners, mounting trays, mating connectors, special cables (if any). Individual price of LRU to be mentioned in detail in a separate sheet.	3 Sets		2				
b	Autopilot with Actuators and Mode Select Panel as per details given in Section 4.2 (II) and compatible with proposed Avionics suite as per Section 4.2 (I)	3 Sets		2				
c	IRS System as per details given in section 4.2 (III) and compatible with proposed Avionics suite as per Section 4.2 (I)	3 sets		2				
d	Tools and Software to Update the database configuration in LRUs ADCU, EGPWS/TAWS, FMS during flight Tests including technical support.	1 Set						
e	Mating connector for each of the LRU as per Appendix B	8		4				
f	Mounting Kits for all LRUs listed in section 4.2	8		4				
g	Documents/reports as per section 4.7	1		1				
h	Training (including training material) as per section 4.6	1		1				
i	Technical Support (Hourly Basis) as per section 4.8	1		As and when CSIR NAL asks for				
j	Technical Support (Supplier shall quote for one visit of one person for 5 working days) Will be invoked on demand only							
k	Shipment, transport, delivery charges if any			1				
	Sub Total			Subtotal (A5) =				

Part II – NRE for Avionics Suite (mode A, Mode B to be mentioned) and Autopilot					
a	MFD page customization for the synoptic pages, utility systems, Engine Indication and crew alerts etc. As per section 4.2.6.6. (Detailed breakdown cost shall be provided for each MFD page)				
c	Audio Warning System customization. As per section 4.4.1.3.				
d	Configuration (if applicable) of Complete Avionics suite for SARAS Mk II				
e	Configuration (if applicable) Complete Autopilot suite (as per section 4.2.6.10)				
f	Any other NRE charges if applicable- detailed description of the task with NRE cost shall be provided.				
	Total Value to be considered for Cat II Avionics suite				

Note: 1.) Autopilot related BOM (including both RE, NRE, deliverables and any other dependent accessories / items) shall be quoted separately for CAT II options without linking it with avionics suite. NAL reserves the right to place PO on both Avionics and AP suite or only Avionics suite (CAT II) at the time of placing PO with the selected Supplier.

2) For the future orders after year 2022, Price escalation as per Internationally accepted Price Escalation Guidelines/CSIR Manual on Procurement of Goods 2019 (section 6.6.4 and annexure-6B) will be taken into account, as per Price Escalation agreement to be signed by selected Supplier for placing orders after year 2022 by either NAL or NAL identified Production partner.

3)For procurement based on this tender, the above clause (i.e., Sr No. 2) is not applicable, but applicable only for future orders after 2022.

4.14 Evaluation Criteria and requirements for presentation to technical evaluation committee

Technical Evaluation Criteria

Sl.No	Criteria	Weightage
1	Number of FAR 23/25 Aircraft types integrated by the major Supplier	15
2	Compliance to technical Specifications for each LRU	10
3	Weight of All LRUs including connectors, antennas and mounting trays	20
4	Electrical Power of all LRUs	20
5	Customization capability of Display Application Pages either using software tool or Core Application Kernel having access to CSIR NAL	15
6	Reliability Number of complete Avionics Architecture proposed by Supplier For Severe Major events as per FAR 23	10
7	Readiness for Indigenous Production in India for Production Order	10
	Total	100

4.15 Presentation to Technical Evaluation Committee

All participating Supplier's shall be called for a technical presentation in person or through virtual meeting platform and Supplier shall make a presentation to Technical Evaluation Committee to defend the technical bid. This meeting if required may be called more than once for more clarification as applicable before finalizing the technical selection of the supplier. The agenda and format of the presentation shall be as follows:

Sl. No	Topic of Presentation
1	Company/ Supplier Profile in Brief
2	Architecture explaining compliance to FAR 23 with each LRU description including explanation on Reliability analysis and failure probability number meeting NAL RFQ requirement.
3	Deliverable's compliance
4	Demonstration of customization of Display Application Pages and its mechanism (either by a dedicated tool (Mode A) or software partitioning method (Mode B))
5	Architecture presentation on the Airframe and Engine interface System (D&D with Cert and Qual)
5	Technical Expertise compliance

4.16 Acceptance Test Scope and Definition

4.16.1 Acceptance Test Scope

Scope of the Acceptance is limited to the Ground Integration Tests of all LRUs in integrated mode to test and clear the individual LRU functionality and hence the complete Architecture. For Phase I delivery. However, Phase II and Phase III deliverables (as per 4.17) will also be tested on the Ground Integration Rig along with the aircraft Integration tests as final ATP.

4.16.2 Acceptance Test Definition

SARAS Mk II Avionics suite shall be tested for the following test scenarios and cases;

- I. As LRU (A detailed ATP shall be prepared by NAL and the ATP shall be carried out as per the approved ATP) which shall consists of
 - a. Verification of all the output parameters in the protocol analyser with the LRU in powered condition
 - b. Verification of the update rate for each of the parameters as per the specifications of the Supplier
 - c. RF level functionality Tests for relevant LRUs using ground RF testers
 - d. Calibration tests for relevant LRUs specific calibration tool (hardware or software provided by Supplier or detailed by Supplier in case of generic procedure)
 - e. All displays shall be tested for the complete Symbolology of all pages in simulation mode to exercise the different modes of the Symbolology including functional and failure modes.

- II. As integrated suite (A detailed ATP shall be prepared by NAL and the ATP shall be carried out as per the approved ATP)
 - a. Verification of all the functionality of complete system with integrated mode in powered condition with all other LRUs connected as per the architecture proposed by Supplier agreed and accepted by NAL after review.
 - b. Verification of the functional and failure modes of the system separately and together.
 - c. RF level functionality Tests for relevant LRUs using ground RF testers in integrated mode with RTU (Radio Tuning Unit) and displays in active mode of transmission and reception of all NAVCOM systems.
 - d. Calibration tests for relevant LRUs specific calibration tool (hardware or software provided by Supplier or detailed by Supplier in case of generic procedure)
 - e. All displays shall be tested for the complete Symbology of all pages in simulation mode to exercise the different modes of the Symbology including functional and failure modes with few of the LRUs in real equipment mode of connectivity while few of the other LRUs be in simulation mode where the real LRU may not provide the required data in static mode like ADCU (Air Data Computing Unit) and AHRS (Attitude and Heading Reference System) etc.).

After successful completion of the ATP at LRU level and Integration level, the Acceptance Test Report shall be prepared by NAL with support from Supplier before 2 months from date of supply of items. **This document shall form the basis for payment milestone of clearing the avionics suite LRUs. There shall be one payment milestone for this ATP activity and Supplier shall separately quote for this (on delivery of one set of LRUs, the Supplier shall be paid for only hardware costs and not the configuration or NRE or any other charges).**

4.16.3 Payment terms and condition

Avionics Suite delivery shall be executed in four phases;

4.16.3.1 Phase I: Delivery

Supply of one set of LRUs with required mating connectors as mentioned in the table below, one set of mounting kits, one set of applicable manuals, documents, one time training and other items as per section 4.6, 4.7 and 4.8. These deliverables shall be delivered to CSIR NAL within 3 months of the purchase order.

Sl. No	Description	Qty.	Means of Acceptance
01	Complete set of Avionics LRU's as per the details given in Section 4.2 (I) along with necessary interface / associated equipment and aircraft installation kits including fasteners, mounting trays, mating connectors, special cables (if any).	02 sets	LRU and Integration Test Report
02	Autopilot with Actuators and Mode Select Panel as per details given in Section 4.2 (II) and compatible with proposed Avionics suite as per Section 4.2 (I)	02 sets	LRU and Integration Test Report
03	IRS System as per details given in section 4.2 (III) and compatible with proposed Avionics suite as per Section 4.2 (I)	02 sets	LRU and Integration Test Report
04	Tools and Software to Update the database configuration in LRUs ADCU, EGPWS, FMS during flight Tests including technical support.	01 set	
05	Mating connector for each of the LRU as per Appendix B	04sets	Inspection
06	Mounting Kit	04 sets	Inspection
07	Documents/reports as per section 4.7	01 set	Inspection
08	Training (including training material) as per section 4.6	01 set	Training Acceptance Report
09	Technical Support	01 set	Acceptance Report

4.16.3.2 Phase II: Delivery Supply of remaining two sets of LRUs with required connectors, mounting kits as mentioned in the table below. These deliverables shall be delivered to CSIR NAL before 3 years from the date of purchase order.

Sl. No	Description	Qty.	Means of Acceptance
01	Complete set of Avionics LRUs as per the details given in Section 4.2 (I) along with necessary interface / associated equipment and aircraft installation kits including fasteners, mounting trays, mating connectors, special cables (if any).	01 sets	LRU and Integration Test Report
02	Autopilot with Actuators and Mode Select Panel as per details given in Section 4.2 (II) and compatible with proposed Avionics suite as per Section 4.2 (I)	01 sets	LRU and Integration Test Report
03	IRS System as per details given in section 4.2 (III) and compatible with proposed Avionics suite as per Section 4.2 (I)	01 sets	LRU and Integration Test Report
04	Mating connector for each of the LRU as per Appendix B	04sets	Inspection
05	Mounting Kit	04sets	Inspection
06	Documents/reports as per section 4.7	N/A	Inspection
07	Training (including training material) as per section 4.6	N/A	Training Acceptance Report
08	Technical Support	N/A	Acceptance Report

4.16.3.3 Phase III: NRE Charges payment
NRE charges payment as per details below:

Sl. No	Description	Qty.	Means of Acceptance
01	MFD page customization for the synoptic pages, utility systems, engine Indication and crew alerts etc. (Detailed breakdown cost shall be provided 1 for each MFD page). as per section 4.2.6.6.	01 sets	LRU and Integration Test Report
02	Audio Warning System customization. as per section 4.4.1.3.	01 sets	LRU and Integration Test Report
03	Complete Autopilot suite configuration. as per section 4.2.6.10.	01 sets	LRU and Integration Test Report
04	Complete Avionics suite configuration for SARAS Mk II	01 set if applicable	LRU and Integration Test Report
05	Any other NRE charges if applicable- detailed description of the task with NRE cost shall be provided.	N/A	

4.16.3.4 Phase IV: Technical Support payment

Technical Support payment for the tasks detailed in as per section 4.8 shall be as follows.

Sl. No	Description	Qty.	Means of Acceptance
01	Supplier shall provide Off-site support for the following (For hourly rate with validity of 5 years from date of purchase order. NAL may use such hourly blocks on the need basis)	Hourly basis	Acceptance Report and MOM. Payment shall be cleared per hour basis for a minimum block of 25 hours or 3 months whichever is earlier.
02	On-site support shall be quantified as one engineer for 5 days (Monday to Friday) of min 8 hours per day. The visit shall be finalised with predefined agenda agreed by both CSIR NAL and the Supplier. Supplier shall provide complete package cost for 5 working days on-site visit and CSIR NAL may ask for such visits based on the requirement during the project time till the final certification of the suite by CEMILAC/DGCA Note: This service will be invoked and used by NAL on need basis. If need does not arise then this service shall not be utilised.	Per visit basis (one person for 5 working days)	Work done Report and MOM

Note: On receipt of the order Supplier shall provide the detailed ICD of all LRUs within a month's time to enable NAL team to start preparing the interface diagrams for integration of LRUs with Avionics Test Rig. This will help in clearing the ATP of the LRUs on delivery with this Avionics Test Rig.

Second delivery (as per phase II) shall be initiated on written request from CSIR NAL only within maximum of 3 years from date of PO.

Supplier shall provide the service and repair support for any LRU if required to be serviced during the integration and certification stages of the program (If AMC is not enabled)

Appendix A

1. SARAS Mk II AVIONICS TSO COMPLIANCE

The following tables reflect the mandatory compliance of Avionics LRUs being proposed by the Supplier. Supplier is required to furnish the Model Number complying to the requirements.

Requirement of Aircraft Avionics as per FAR 23/135/91 with applicable TSO, AC and SAE complianceDisplays

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
ELECTRONIC FLIGHT DECK DISPLAYS	TSO-C113 Airborne multipurpose electronic displays TSO-C153 Guidance for Integrated Modular Avionics (IMA)	
Electronic Map Display Equipment	TSO-C165 Electronic Map Display Equipment for Graphical Depiction of Aircraft Position	RTCA/DO 257A, Minimum Operational Performance Standards for the Depiction of Navigational Information on Electronic Maps.
SVS (Synthetic Vision System)		RTCA/DO-315A, Minimum Aviation System Performance Standards (MASPS) for Synthetic Vision Systems.
EFB (Electronic Flight Bag)		RTCA/DO-257, Minimum Operational Performance Standards for the Depiction of Navigation Information on Electronic Maps
Electronic Flight Deck Displays	TSO-C113 Airborne multipurpose electronic displays	
EICAS (Engine Indication and Crew Alerting System)	TSO-C113 Airborne multipurpose electronic displays	

Instruments with indication on display

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
An airspeed indicating system	TSO-C46A Maximum Allowable Airspeed Indicator Systems TSO-C2d Airspeed instruments TSO-C16a Electrically Heated Pitot and Pitot-Static Tubes	.
Airborne weather radar equipment	TSO-C63c Airborne Weather Radar Equipment	RTCA DO-173, Minimum Operational Performance Standards for Airborne Weather and Ground Mapping Pulsed Radars
Sensitive altimeter	TSO-C10B Altimeter, Pressure Actuated, Sensitive Type	RTCA DO-103, Minimum Performance Standards for Airborne Radar Altimeter Equip-ment Intended for

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
	TSO-C67 Airborne Radar Altimeter Equipment (For Air Carrier Aircraft) TSO-C87 Airborne low-range radio altimeter	Determining Pressure Gradients and Operating Within the Radio Frequency Band of 420-460 Megacycles.
Rate-of-climb indicator (vertical speed)	TSO-C8d Rate-of-climb indicator	
AHRS (Attitude and Heading Reference System) with connectors, memory module etc.	TSO-C4c - Bank and Pitch Instruments TSO-C3e Turn and Slip Instrument TSO-C6e - Direction Instrument Magnetic (Gyroscopically Stabilized)	
Magnetic direction indicator	TSO-C7D Direction Instrument, Magnetic Non-Stabilized Type (Magnetic Compass) TSO-C6e Direction instrument, magnetic (gyroscopically stabilized)	
Terrain awareness and warning system	TSO-C151B Terrain Awareness and Warning System TSO-C194 Helicopter Terrain Awareness and Warning System (HTAWS) TSO-C92c, Airborne ground proximity warning equipment	Certification RTCA/DO-161A, Minimum Performance Standards - Airborne Ground Proximity Warning Equipment

Functionalities indicated on the display

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
Attitude Director Indicator (ADI)	TSO-C4C Bank and pitch instruments TSO-C3e Turn and Slip Instrument	
Gyroscopic rate-of-turn indicator combined with an integral slip-skid indicator	TSO-C3e Turn and Slip Instrument	
Gyroscopic bank and pitch indicator	TSO-C4C Bank and pitch instruments	
Altitude indicator	TSO-C10B Altimeter, Pressure Actuated, Sensitive Type	
Horizontal Situation Indicator	TSO-C7D Direction Instrument, Magnetic Non-Stabilized Type (Magnetic Compass) TSO-C6e DIRECTION INSTRUMENT, MAGNETIC (GYROSCOPICALLY STABILIZED) TSO-C5f DIRECTION INSTRUMENT, NON-MAGNETIC (GYROSCOPICALLY STABILIZED)	

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
Gyroscopic direction indicator	TSO-C7D Direction Instrument, Magnetic Non-Stabilized Type (Magnetic Compass) TSO-C6e direction instrument, magnetic (gyroscopically stabilized)	

Instruments or warnings indicated on the display

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
Landing gear position indicator	TSO-C135, Transport Airplane Wheels and Wheel and Brake Assemblies	
Pitot heat indication system	TSO-C16a, Electrically heated pitot and pitot-static tubes	
Fuel pressure warning	TSO-C47a Fuel, oil, and hydraulic pressure instruments TSO-C55a fuel and oil quantity instruments	
Fire-warning devicesSmoke detector system with warning light in the cockpit	TSO-C1d Cargo Compartment Fire Detection Instruments TSO-C11E Power plant Fire Detection Instruments (Thermal and Flame Contact Types) TSO-C79 Fire detectors (radiation sensing type)	
Oil pressure indicator	TSO-C47a Fuel, oil, and hydraulic pressure instruments	
Radio Altimeter System with mounts, connectors, antenna etc.	TSO-C87 Airborne low-range radio altimeter	
Takeoff Configuration Warning Systems Takeoff warning system.		

Miscellaneous instruments with dedicated displays

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
Outside air temperature indicator with probe	TSO-C43c TEMPERATURE INSTRUMENTS	
Free-air temperature indicator	TSO-C43c TEMPERATURE INSTRUMENTS	

Communication Systems

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
VHF RADIO COMMUNICATIONS EQUIPMENT	TSO-C169A VHF Radio Communications Transceiver Equipment Operating Within Radio Frequency Range 117.975 To 137.000 Megahertz	RTCA/DO-186B, Minimum Operational Performance Standards for Airborne Radio Communications Equipment Operating Within the Radio Frequency Range 117.975-137.000 MHz.
Audio Management system with connectors	TSO-C139, aircraft audio systems and equipment.	RTCA/DO-214, Audio Systems Characteristics and Minimum Performance Standards for Aircraft Audio Systems and Equipment
Cabin/ Pilot Interphone System	TSO-C139, aircraft audio systems and equipment	RTCA/ DO-170, "Audio Systems Characteristics and Minimum Performance Standards Aircraft Microphones (Except Carbon), Aircraft Headsets and Speakers, Aircraft Audio Selector Panels and Amplifiers,"
Mode S Transponder with antenna, mounts, connectors etc. ATC transponder equipment	TSO-C74c, AIRBORNE ATC TRANSPONDER EQUIPMENT TSO-C74d Air Traffic Control Radar Beacon System (ATCRBS) Airborne Equipment TSO-C112c Air Traffic Control Radar Beacon System/Mode Select (ATCBS/Mode S) Airborne Equipment TSO-C119C TRAFFIC ALERT AND COLLISION AVOIDANCE SYSTEM (TCAS) AIRBORNE EQUIPMENT, TCAS II WITH OPTIONAL HYBRID SURVEILLANCE	RTCA DO-138, Environ-mental Conditions and Test Procedures for Airborne Electric/Electrical Equipment and Instruments. RTCA DO-144A Mini-mum Operational Characteristics-Airborne ATC Transponder Systems Instruments following DO-144A RTCA DO-181C Minimum operation Performance Standard for Air Traffic Control Radio Beacon System/ Mode Select (ATCRBS/Mode S) Airborne Equipment RTCA DO-185A Minimum operation Performance Standard for TCAS II Airborne Equipment
Aircraft Audio Systems and Equipment	TSO-C139 Aircraft Audio Systems and Equipment	RTCA/DO-214, Audio Systems Characteristics and Minimum Performance Standards for Aircraft Audio Systems and Equipment
Headsets and speakers	TSO-C57A Headsets and speakers	RTCA DO-170, Audio Systems Characteristics and Minimum Performance Standards Aircraft Microphones (Except Carbon), Aircraft Headsets and Speakers, Aircraft Audio Selector Panels and
Aircraft microphones	TSO-C58A Aircraft microphones	RTCA DO-170, Audio Systems Characteristics and Minimum Performance Standards Aircraft Microphones (Except Carbon), Aircraft Headsets and Speakers, Aircraft Audio Selector Panels and Amplifiers

Navigation Systems
Long range navigation

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
Ground Based Augmentation System Positioning and Navigation Equipment	TSO-C161 Ground Based Augmentation System Positioning and Navigation Equipment	RTCA/DO-253A, Minimum Operational Performance Standards for GPS Local Area Augmentation System Airborne Equipment
Airborne Navigation Sensors Using the Global Positioning System	TSO-C145c Airborne Navigation Sensors Using the Global Positioning System Augmented by the Satellite Based Augmentation System TSO-C190, Active Airborne Global Navigation Satellite System (GNSS) Antenna TSO-C144a, Passive Airborne Global Navigation Satellite System (GNSS) Antenna, applicable only to operational Class 1 equipment	RTCA/DO-229D, Minimum Operational Performance Standards for Global Positioning System/Wide Area Augmentation System Airborne Equipment RTCA/DO-228, Minimum Operational Performance Standards for Global Navigation Satellite System (GNSS) Airborne Antenna Equipment
Passive Airborne Global Navigation Satellite System (GNSS) Antenna	TSO-C144A Passive Airborne Global Navigation Satellite System (GNSS) Antenna TSO-C190, Active Airborne Global Navigation Satellite System (GNSS) Antenna	RTCA/DO-228, Minimum Operational Performance Standards for Global Navigation Satellite System (GNSS) Airborne Antenna Equipment RTCA/DO-229D, Minimum Operational Performance Standards for Global Positioning System/Wide Area Augmentation System Airborne Equipment
Airborne Supplemental Navigation Equipment Using the Global Positioning System (GPS)	TSO-C129A Airborne Supplemental Navigation Equipment Using The Global Positioning System (GPS)	RTCA/DO-208, "Minimum Operational Performance Standards for Airborne Supplemental Navigation Equipment Using Global Positioning System (GPS) RTCA/DO-200, "Preparation, Verification and Distribution of User Selectable Navigation Data Buses
Stand-Alone Airborne Navigation Equipment	TSO-C146C Stand-Alone Airborne Navigation Equipment Using the Global Positioning System Augmented By The Satellite Based Augmentation System	RTCA/DO-229D, Minimum Operational Performance Standards for Global Positioning System/Wide Area Augmentation System Airborne Equipment RTCA/DO-200A, Standards for Processing Aeronautical Data
Airborne global positioning system antenna	TSO-C144 AIRBORNE GLOBAL POSITIONING SYSTEM ANTENNA	RTCA/DO-228, Minimum Operational Performance Standards for Airborne Global Navigation Satellite System Antenna

Enroute navigation

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
DME (Distance Measuring Equipment) System with antenna, accessories, connectors etc.	TSO-C66C DISTANCE MEASURING EQUIPMENT (DME) OPERATING WITHIN THE RADIO FREQUENCY RANGE OF 960-1215 MEGAHERTZ	RTCA DO-189, Minimum Performance Standard for Airborne Distance Measuring Equipment (DME) Operating Within the Radio Frequency Range of 960-1215 Megahertz
VOR navigation equipment VIR (VOR ILS Receiver) System with VOR (Very High Frequency Omni Range), LOC(Localizer),GS (Glide Slope), MB (Marker Beacon) antenna, accessories, connectors etc.	TSO-C40 VOR Radio Receiving Equipment Operating within the Radio Frequency Range of 108-118 Megacycles (For Air Carrier Aircraft)	RTCA/DO-196, Minimum Operational Performance Standards for Airborne VOR Receiving Equipment Operating Within the Radio Frequency Range of 108-117.95 MHz
FMS (Flight Management System) with indicator, mounts and connectors	TSO-C60b Airborne Area Navigation Equipment Using Loran C Inputs TSOC94a Omega Receiving Equipment Operating Within the Radio Frequency Range of 10.2 to 13.6 Kiloherzt TSO-CI15 Airborne Area Navigation Equipment Using Multi-Sensor Inputs TSO-CI20 Airborne Area Navigation Equipment Using Omega/VLF Inputs	RTCA DO-180A, RTCA DO-187, RTCA DO-190, RTCA DO-194, Minimum operational Performance Standards for Airborne Area Navigation equipment using LOREN-C Inputs.
ADF (Automatic Direction Finder) System with antenna, mounts, connectors etc.	TSO-C41d Airborne Automatic Direction Finding (ADF) Equipment	RTCA DO-179, Minimum Operational Performance Standards for Automatic Direction Finding (ADF) Equipment

IL S Systems

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
(ILS/ GPS Based Landing)- (Instrument Landing System)	TSO-C34e ILS Glide slope receiving equipment operating within the radio frequency range of 328.6-335.4 megahertz (MHz) TSO-C35D Airborne Radio Marker Receiving Equipment TSO-C36e Airborne ILS localizer receiving equipment operating within the radio frequency range of 108-112 megahertz (MHz)	DO-143 entitled "Minimum Performance Standards Airborne Radio Marker receiving Equipment Operating on 75 Megahertz" RTCA/DO-195, "Minimum Operational Performance Standards for Airborne ILS Localizer Receiving Equipment Operating Within the Radio Frequency Range of 108-112 MHz," RTCA/DO-192, Minimum Operational Performance Standards for Airborne ILS Glide Slope Receiving Equipment Operating Within the Radio Frequency Range of 328.6-335.4 MHz

Miscellaneous navigation instruments

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
AIR DATA COMPUTER with connectors	TSO-C106, Air data computer	
Magnetic Compass	TSO-C7D Direction Instrument, Magnetic Non-Stabilized Type (Magnetic Compass)	

Surveillance Systems

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
TCAS (Traffic Alert and Collision Avoidance System) with mounts, antenna, connectors etc.	TSO-C119C Traffic alert and collision avoidance system (TCAS) Airborne equipment, tcas ii with optional hybrid surveillance TSO-C118 Traffic Alert and Collision Avoidance System (Tcas) Airborne Equipment, Tcas I	RTCA/DO-185B, Minimum Operational Performance Standards for Traffic Alert and Collision Avoidance System II (TCAS II) RTCA/DO-300, Minimum Operational Performance Standards for Traffic Alert and Collision Avoidance System II (TCAS II) Hybrid Surveillance RTCA/DO-197, Minimum Operational Performance Standards for An Active Traffic Alert and Collision Avoidance System I
Extended Squitter Automatic Dependent Surveillance	TSO-C166a Extended Squitter Automatic Dependent Surveillance - Broadcast (ADS-B) and Traffic Information Service - Broadcast (TIS-B) Equipment Operating on the Radio Frequency of 1090 Megahertz (MHz)	RTCA/DO-260A, Minimum Operational Performance Standards for 1090 MHz Extended Squitter Automatic Dependent Surveillance - Broadcast (ADS-B) and Traffic Information Services - Broadcast (TIS-B) RTCA/DO-243, Guidance for Initial Implementation of Cockpit Display of Traffic Information RTCA/DO-249, Development and Implementation Planning Guide for Automatic Dependent Surveillance Broadcast (ADS-B) Applications

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
		RTCA/DO-259, Application Descriptions for Initial Cockpit Display of Traffic Information (CDTI) Applications
ADS-B (Automatic Dependent Surveillance-Broadcast) and Traffic Information Service-Broadcast (TIS-B) Equipment	TSO-C166b Extended Squitter Automatic Dependent Surveillance - Broadcast (ADS-B) and Traffic Information Service - Broadcast (TIS-B) Equipment Operating on the Radio Frequency of 1090 Megahertz (MHz) TSO-C154c, Universal Access Transceiver (UAT) Automatic Dependent Surveillance-Broadcast (ADS-B) Equipment Operating on the Frequency of 978 MHz	RTCA/DO-260A, Minimum Operational Performance Standards for 1090 MHz Extended Squitter Automatic Dependent Surveillance - Broadcast (ADS-B) and Traffic Information Services - Broadcast (TIS-B) RTCA/DO-289, Minimum Aviation System Performance Standards for Aircraft Surveillance Applications RTCA/DO-243, Guidance for Initial Implementation of Cockpit Display of Traffic Information RTCA/DO-249, Development and Implementation Planning Guide for Automatic Dependent Surveillance Broadcast (ADS-B) Applications RTCA/DO-259, Application Descriptions for Initial Cockpit Display of Traffic Information (CDTI) Applications
EGPWS (Enhanced ground Proximity Warning System)	TSO-C92c, AIRBORNE GROUND PROXIMITY WARNING EQUIPMENT	RTCA DO-161A, Minimum Performance Standards for Airborne Ground Proximity Warning Equipment
Airborne weather radar equipment	TSO-C63c Airborne Weather Radar Equipment	RTCA DO-173, Minimum Operational Performance Standards for Airborne Weather and Ground Mapping Pulsed Radars

1.7 Data Recording Systems

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
Solid State Combined Voice and Data Recorder with accessories	TSO-C124b, Flight Data Recorder Systems TSO-C123b, Cockpit Voice Recorder Equipment TSO-C84, Cockpit Voice Recorder	
AIRCRAFT COCKPIT IMAGE RECORDER SYSTEM	TSO-C176 Aircraft cockpit image recorder systems	
Cockpit voice recorders.	TSO-C123b Cockpit Voice Recorder Equipment TSO-C84 Cockpit Voice Recorder	
DATA LINK RECORDER SYSTEMS	TSO-C177 DATA LINK RECORDER SYSTEMS	
Flight data recorder	TSO-C124b Flight Data Recorder Systems	
AIRBORNE NAVIGATION DATA STORAGE SYSTEM	TSO-C109 Airborne navigation data storage system	
Flight Data Acquisition Unit	TSO-C124b Flight Data Recorder Systems	
Autopilot	TSO-C52b (FD Equipment) TSO-C9c (Autopilot)	RTCA DO-325, MOPS for Automatic Flight Guidance and Control Systems and Equipment

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
	TSO-C198 (Autopilot Flight Guidance and Control System (AFGCS)) Equipment	

1.8 Sub systems impacting avionics equipment

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
Pitot tubes with accessories	TSO-C16a Electrically Heated Pitot and Pitot-Static Tubes	
TAT (Total Air Temperature) sensor with heater	TSO-C43c, TEMPERATURE INSTRUMENTS	

1.9 Emergency Equipment

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
Emergency Locator Transmitter	TSO-C91A EMERGENCY LOCATOR TRANSMITTER (ELT) EQUIPMENT TSO-C126a 406 MHz Emergency Locator Transmitter (ELT)	RTCA DO-183, Minimum Operational Performance Standards for Emergency Locator Transmitters; Automatic Fixed - ELT (AF), Automatic Portable - ELT (AP), Automatic Deployable - ELT (AD), Survival - ELT (S); Operating on 121.5 and 243.0 Megahertz RTCA DO-204A, minimum operational performance standards (MOPS) 406 MHz emergency locator transmitter (ELT) RTCA/DO-311, minimum operational performance standards for rechargeable lithium battery systems. RTCA/DO- 188, emergency locator transmitter (ELT) batteries guidance and recommendations, for guidance and recommendations to solve ELT battery problems.

1.10 Functionalities indicated on the display

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
ADI	TSO-C4C Bank and pitch instruments TSO-C3e Turn and Slip Instrument	

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
Gyroscopic rate-of-turn indicator combined with an integral slip-skid indicator	TSO-C3e Turn and Slip Instrument	
Gyroscopic bank and pitch indicator	TSO-C4C Bank and pitch instruments	
Altitude indicator	TSO-C10B Altimeter, Pressure Actuated, Sensitive Type	
Horizontal Situation Indicator	TSO-C7D Direction Instrument, Magnetic Non-Stabilized Type (Magnetic Compass) TSO-C6e DIRECTION INSTRUMENT, MAGNETIC (GYROSCOPICALLY STABILIZED) TSO-C5f DIRECTION INSTRUMENT, NON-MAGNETIC (GYROSCOPICALLY STABILIZED)	
Gyroscopic direction indicator	TSO-C7D Direction Instrument, Magnetic Non-Stabilized Type (Magnetic Compass) TSO-C6e direction instrument, magnetic (gyroscopically stabilized)	

1.11 Instruments or warnings indicated on the display

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
Landing gear position indicator	TSO-C135, Transport Airplane Wheels and Wheel and Brake Assemblies	
Pitot heat indication system	TSO-C16a, Electrically heated pitot and pitot-static tubes	
Augmentation liquid quantity indicator		
Gas temperature indicator	TSO-C43c Temperature instruments	
Fuel pressure warning	TSO-C47a Fuel, oil, and hydraulic pressure instruments TSO-C55a fuel and oil quantity instruments	
Fire-warning devices smoke detector system with warning light in the cockpit	TSO-C1d Cargo Compartment Fire Detection Instruments TSO-C11E Power plant Fire Detection Instruments (Thermal and Flame Contact Types) TSO-C79 Fire detectors (radiation sensing type)	
Oil pressure indicator	TSO-C47a Fuel, oil, and hydraulic pressure instruments	
Fuel pressure indicator	TSO-C47a Fuel, oil, and hydraulic pressure instruments	.
Fuel quantity indicator	TSO-C55a Fuel and oil quantity instruments	

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
Fuel flow meter or fuel mixture indicator	TSO-C44c Fuel flowmeters	
Manifold pressure indicator	TSO-C45b Manifold pressure instruments	
Oil quantity indicator	TSO-C55a Fuel and oil quantity instruments	
Radio Altimeter System with mounts, connectors, antenna etc.	TSO-C87 Airborne low-range radio altimeter	
Oil-in temperature indicator	TSO-C43c Temperature instruments	
AHRS(Attitude and Heading Reference System) with connectors, memory module etc.	TSO-C4c - Bank and Pitch Instruments TSO-C3e Turn and Slip Instrument TSO-C6e - Direction Instrument Magnetic (Gyroscopically Stabilized)	
Takeoff Configuration Warning Systems Takeoff warning system.		

1.12 Miscellaneous instruments with dedicated displays

Line Replaceable Unit (LRU)/Functionality on each LRU	TSOs (US FAA TSO)	DO (Radio Technical Commission for Aeronautics Document)
Outside air temperature indicator with probe	TSO-C43c TEMPERATURE INSTRUMENTS	
Free-air temperature indicator	TSO-C43c TEMPERATURE INSTRUMENTS	

Appendix B LRU's with Weight, Volume and Power, Compliance and MTBF details

Sl. No.	Item Description	Type/Part No.	Quantity	Length x Width x height	Weight	Power	Compliant TSO	MTBF
			Proposed per Avionics Suite for single aircraft					
Communication Systems								
1	VHF Communication System							
	a) Communication Receiver VHF							
	b) Mount and connector Kit							
	c) Installation Kit							

Sl. No.	Item Description	Type/Part No.	Quantity	Length x Width x height	Weight	Power	Compliant TSO	MTBF
			Proposed per Avionics Suite for single aircraft					
	VHF Communication System Antenna							
	a) Antenna - Bottom							
	b) Antenna - Top							
2	Audio Management System (AMS)							
	a) Connector Kit							
	b) Head set							
	c) Audio Jacks							
	d) Speaker with installation kit							
3	Emergency Locator/Transmitter (ELT)							
	a) ELT							
	b) ELT Antenna with connector kit							
4	Radio Tuning Unit							
	a) Installation Kit (if required)							
	b) Strain Relief connectors							
5	Audio Warning Generator							
	Mating Connectors Kit							
Navigation Systems								
6	VIR System with VOR, LOC, GS, MB VIR							
	a) Navigation Receiver							
	b) Mount and connector Kit							
	c) Installation Kit							
	Receivers Antenna							
	a) Marker beacon antenna with dual port							
	b) Phasing coupler							
	c) Glide slope antenna with dual port							
	d) VOR/LOC antenna with phasing coupler & power divider							

Sl. No.	Item Description	Type/Part No.	Quantity	Length x Width x height	Weight	Power	Compliant TSO	MTBF
			Proposed per Avionics Suite for single aircraft					
7	Attitude Heading Reference System (AHRS)							
	a) Mating Connector							
	b) Flux Detector Unit							
	c) Flux detector Mating Connector							
	d) Control Panel							
	e) Control Panel Mating Connectors							
8	Automatic Direction Finder (ADF) System							
	a) Receiver with Lock Relay							
	b) Antenna							
	c) Mounting Kit							
	d) Connector Kit							
	e) Antenna Mating Connector							
9	Air Data Computer (ADCU)							
	a) Mating Connectors and installation kit if any							
	Total Air Temperature Sensor (TAT)							
	a) Installation Kit							
	b) DC Current level detector							
	c) Mating Connector							
	Dual Static and a Pitot Pressure Port/sensor							
	a) Static Pressure sensor with accessories and mounting kit							
	b) DC Current Level Detector							
	c) Pitot Pressure sensor with accessories and mounting kit							
	d) Complete installation kit for pitot Sensor							
	e) DC Current Level Detector for both Static and Pitot							

Sl. No.	Item Description	Type/Part No.	Quantity	Length x Width x height	Weight	Power	Compliant TSO	MTBF
			Proposed per Avionics Suite for single aircraft					
	f) Mating Connector and installation kit for							
10	Distance Measuring Equipment (DME) System							
	a) DME Receiver							
	b) Mount Kit							
	c) Connector Kit							
	DME System Antenna							
	a) Antenna, L-Band							
11	NAV/Flight Management System (FMS) with Independent GPS system							
	a) Navigation Computer							
	b) Configuration Module							
	c) CDU							
	d) Installation mounting and Connector kit							
	e) Data Transfer Unit							
	f) DTU Installation Kit							
	g) GPS Antenna							
	h) GPS Antenna Installation Kit							
RADAR SUITE								
12	Color Weather Radar System with Predictive wind shear							
	a) Antenna / Receiver / Transmitters shall not exceed 18 inches							
	b) Installation Kit							
	c) weather radar indicator							
	d) Antenna/Receiver							
	e) Mounting tray Kit							
	f) Configuration Module							
	g) Indicator Installation Kit							

Sl. No.	Item Description	Type/Part No.	Quantity	Length x Width x height	Weight	Power	Compliant TSO	MTBF
			Proposed per Avionics Suite for single aircraft					
13	Terrain Awareness Warning System (TAWS) with reactive and predictive wind shear features							
	a) TAWS Computer w/o dedicated GPS input							
	b) Mounting Tray							
	c) Configuration Module							
	d) Connector kit with end fittings							
	e) TAWS Annunciator Assemblies							
14	Radio Altimeter (RA) System							
	a) Transmitter / Receiver							
	b) Antenna							
	c) Mount Kit							
	d) Mating Connector kit							
	e) RF connectors							
Surveillance Suite								
15	TCAS II							
	a) Tx/Rx							
	b) Directional Antenna							
	d) TCAS Installation kit							
	e) TTR mount, installation and connector kit							
16	Mode S ATC Transponder							
	a) Transponder							
	b) Mounting Tray							
	c) Connector Kit							
	d) Mating TNC 90-degree bend							
	e) Gasket							
	ATC Transponder (Mode S) Antenna							
	a) Antenna, L-Band							
Cockpit Displays								

Sl. No.	Item Description	Type/Part No.	Quantity	Length x Width x height	Weight	Power	Compliant TSO	MTBF
			Proposed per Avionics Suite for single aircraft					
17	Cockpit/Displays (Configurable PFD/MFD)							
	a) Connectors, installation and mounting Kit							
	b) Installation Mounts							
Data Recorders								
18	Solid State Flight Data Recorder with ULB							
	a) Control Unit							
	b) Mating connector kits							
19	Solid State Voice Recorder With ULB							
	a) Control Unit							
	b) Mating connector kit							
	c) Cockpit Area Microphone							
	d) Cockpit Area Microphone Mating connector							
20	Digital standby system with inbuilt battery							
	a) Total Air Temperature Sensor (TAT) with heater							
	b) Dual Static Port with heater							
	c) Pitot Port with heater							
	d) DC Current Level Detectors for static, pitot and TAT							
	e) installation kit							
21	Flight data acquisition Unit with 717 interfaces							
	Installation Kit							
22 Autopilot	Autopilot							
	Autopilot/Flight Guidance Computers							
	Autopilot Servos (3nos)							
	Pitch Trim Servos (2nos)							

Sl. No.	Item Description	Type/Part No.	Quantity	Length x Width x height	Weight	Power	Compliant TSO	MTBF
			Proposed per Avionics Suite for single aircraft					
	Mode Control Panel (1 no)							
	Central pedestal Turn controller (1 no)							
	Any other components required for your proposed architecture							
23	Inertial Reference System (IRS)							
	a) Magnetic sensor							
	b) Installation Kit							

Note:

1. Supplier to indicate all Mating connectors, installation kits, screws and all accessories so as to enable fitment of the supplied LRU onboard aircraft.
2. The power requirement is not applicable to passive systems/components

Appendix C: Abbreviations/Acronyms

S. No.	Abbreviation/Acronym	EXPANSION
1	A/C	Aircraft
2	AC	Advisory Circular
3	ACMSP	Autopilot Control Mode Selection Panel
4	ADCU	Air Data Computer Unit
5	ADCU	Air Data Control Unit
6	ADF	Automatic Direction Finder
7	ADI	Attitude Directional Indicator
8	AHRS	Attitude Heading Reference System
9	AMC	Annual Maintenance Charges
10	AMS	Audio Management System
11	AP	Actuator Input/output Processor

S. No.	Abbreviation/Acronym	EXPANSION
12	ARP	Aerospace Recommended Practice
13	ATC	Air Traffic Control
14	ATC	Air Traffic Controller
15	ATP	Acceptance Test Plan
16	CAT II	CAT II: Operational performance Category II
17	CDR	Critical Design Review
18	CEMILAC	Centre for Military Airworthiness Certification
19	CFIT	Controlled Flight Into Terrain
20	COC	Certificate Of Conformance
21	COM system	Communication System
22	COTS	Commercial Off-The-Shelf
23	CPCS	Cabin Pressure Control Systems
24	CSIR	Council of Scientific And Industrial Research
25	DAL	Design Assurance Level
26	DGCA	Director General of Civil Aviation
27	DME	Distance Measuring Equipment
28	DTU	Data Transfer Unit
29	DU	Display Unit
30	EASA	European Union Aviation Safety Agency
31	ECS	Environmental Control system
32	EDCU	Engine Data Control Unit
33	EFIS	Electronic Flight Instrumentation System
34	EGPWS	Enhanced Ground Proximity Warning System
35	EGT	Exhaust Gas Temp
36	EICAS	Engine Indication and Crew Alerting System
37	ELT	Emergency Locator Transmitter
38	EMC	Electromagnetic Compatibility
39	EMI	electromagnetic interference
40	EVS	Enhanced Vision System
41	FAA	Federal Aviation Administration
42	FAR	Federal Aviation Regulation
43	FDAP	Flight Data Acquisition Unit
44	FDAU	Flight Data Acquisition Unit
45	FMS	Flight Management System
46	GNSS	Global Navigation Satellite System

S. No.	Abbreviation/Acronym	EXPANSION
47	GPS	Global Positioning System
48	GS	Glide Slope
49	IFR	Instrument Flight Rules
50	ILS	Instrument Landing System
51	ISIS	Integrated Standby Instrument System
52	JAA	Joint Aviation Authority
53	JTSO	Joint Technical Standard Orders
54	LH	Left Hand
55	LNAV	Lateral Navigation
56	LRM	Line Replaceable Module
57	LRU	Line Replaceable Unit
58	MFD	Multi-Function Display
59	MIP	Main Interface Panel
60	MOM	Minutes Of Meeting
61	NAL	National Aerospace Laboratories
62	NAV	Navigation System
63	NRE	Non Recurring Expenses
64	OAT	Out Side Air Temperature
65	OEM	Original Equipment Manufacturer
66	PBN	Performance Based Navigation
67	PDR	Preliminary Design Review
68	PFD	Primary Flight Display
69	PO	Purchase Order
70	RADALT	Radio Altimeter
71	RFQ	Request For Quotation
72	RH	Right Hand
73	RNAV	Area Navigation
74	RNP	Required Navigation Performance
75	RSPL	Recommended Spares Part List
76	RTCA	Radio Technical Commission for Aeronautics
77	RTU	Radio Tuning Unit
78	SAE	Society of Automotive Engineers
79	SBAS	Satellite-Based Augmentation System
80	SOW	Statement Of Work
81	SSCVR	Solid State Cockpit Voice Recorder

S. No.	Abbreviation/Acronym	EXPANSION
82	SSFDR	Solid State Flight Data Recorder
83	SVS	Synthetic Vision System
84	SW	Software Version
85	TAT	Total Air Temperature
86	TAWS	Terrain Awareness And Warning System
87	TCAS	Traffic Collision Avoidance System
88	TEC	Technical Evaluation Committee
89	TSO	Technical Standard Orders
90	USB	Universal Serial Bus
91	VFR	Visual Flight Rules
92	VHF	Very High Frequency
93	VIR	VOR-ILS Receiver
94	VNAV	Vertical Navigation

Appendix D
Input signal requirements for NALs indigenous system

NAL proposes to integrate the indigenous system in the second phase of production version as part of make in India Initiative. This indigenous system shall be using the data from all the sensors and system (architecture) through the digital bus with maximum update rate of 40 Hz for critical sensors.

The following is the minimum (indicative and not exhaustive) list of inputs that are required for the NALs indigenous system. These signals have to be routed to the NALs indigenous system through ARINC 429 Buses.

List of Input Signals required for NALs indigenous System

Sl. No.	Input Signal	Label	Range	Update Rate (Hz)	Accuracy/required	Resolution required	Remarks
ADCU Left & Right (ARINC 429)							
1.	Pressure Altitude	203	±131072 feet	32	0.5 feet	0.5 feet	
2.	Baro-Corrected Altitude	204	±131072 feet	32	0.5 feet	0.5 feet	
3.	Calibrated Airspeed	206	0 to 1024 knots	16	0.5 knot	0.00390625	
4.	True Airspeed	210	0 to 2048	16	0.5 knot	0.007812	

Sl. No.	Input Signal	Label	Range	Update Rate (Hz)	Accuracy/required	Resolution required	Remarks
			knots			5	
5.	Altitude rate/Vertical Speed	212	±32768 feet/min	32	0.5 feet/min	0.125	
6.	Impact Pressure (Q-bar)	215	0 to 512 mb	16	± 7.7 mb	0.001953 125	
7.	Vmo	207	0 to 1024 knots	16	± 1 knot	0.003906 25	
AHRS Left & Right (ARINC 429)							
8.	Magnetic Heading	320	±180 deg	4 0	± 2.0 deg	0.000686 6455078 125	
9.	Pitch Angle	324	±180 deg	40	±0.5 deg	0.000686 6455078 125	
10.	Roll Angle	325	±180 deg	40	±0.5 deg	0.000686 6455078 125	
11.	Body pitch rate	326	±128 deg/sec	40	± 0.1 deg/sec	0.000488 28125	
12.	Body roll rate	327	±128 deg/sec	40	± 0.1 deg/sec	0.000488 28125	
13.	Body yaw rate	330	±128 deg/sec	40	± 0.1 deg/sec	0.000488 28125	
14.	Body long. accln	331	±4 g	40	± 0.01 g	0.000015 2587890 625	
15.	Body lateral accln	332	±4 g	40	± 0.01 g		
16.	Body norm accln	333	±4 g	40	± 0.01 g		
RADALT Left & Right (ARINC 429)							
17.	Radio Altitude	164	8192 feet	20	± 1 feet	0.125	
18.	RADALT trip	270 - Bit 20	NA	NA	1- tripped	NA	
EFIS Left & Right (ARINC 429)							
19.	Selected Course #1	100	±180 deg	20	NA	180*2^-	

Sl. No.	Input Signal	Label	Range	Update Rate (Hz)	Accuracy/required	Resolution required	Remarks
						12 degs	
20.	Selected Heading	101	±180 deg	20	NA	180*2 ⁻¹² degs	
21.	Selected Altitude	102	65536 feet	20	NA	1 feet	
22.	Selected Course #2	110	±180 deg	20	NA	0.43945	
23.	Decision Height	170	±7000 ft	20	NA	1 feet	
24.	Course Error	300	±180 deg	20	NA	180*2 ⁻¹⁴ degs	
25.	Heading error	301	±180 deg	20	NA	180*2 ⁻¹⁴ degs	
26.	Course Datum	302	±180 deg	20	NA	0.01 deg	
27.	Discrete Word	270					
Format			NA				
Bit 11 NAV Selection 0 = VOR; 1 = ILS			NA	NA	NA	NA	
Bit 12 NAV Selection; 1= VOR1			NA	NA	NA	NA	
Bit 13 NAV Selection; 1= VOR2			NA	NA	NA	NA	
Bit 14 NAV Selection; 1 = FMS			NA	NA	NA	NA	
Bit 15 NAV Selection; 1 = ADF			NA	NA	NA	NA	
Bit 16 0			NA	NA	NA	NA	
Bit 17 0			NA	NA	NA	NA	
Bit 18 ARC Mode ; 0 = ARC mode;1 = Full compass			NA	NA	NA	NA	
Bit 19 Gnd Speed / TTG Selection 0 = Gnd Speed; 1 = TTG			NA	NA	NA	NA	
Bit 20 Symbol Generator 0 = SG1; 1 = SG2			NA	NA	NA	NA	
Bit 21 Range Code			NA	NA	NA	NA	
Bit 22 Range Code			NA	NA	NA	NA	

Sl. No.	Input Signal	Label	Range	Update Rate (Hz)	Accuracy/required	Resolution required	Remarks
	Bit 23 BP1 SSC 0 = ADF; 0 = VOR1; 1 = VOR2; 1 = FMS		NA	NA	NA	NA	
	Bit 24 BP1 SSC 0 = ADF; 1 = VOR1; 0 = VOR2; 1 = FMS		NA	NA	NA	NA	
	Bit 25 BP2 SSC 0 = ADF; 0 = VOR1; 1 = VOR2; 1 = FMS		NA	NA	NA	NA	
	Bit 26 BP2 SSC 0 = ADF; 1 = VOR1; 0 = VOR2; 1 = FMS		NA	NA	NA	NA	
	Bit 27 BP2 Selection 0 = ON; 1 = OFF		NA	NA	NA	NA	
	Bit 28 BP1 Selection 0 = ON; 1 = OFF		NA	NA	NA	NA	
VOR-ILS Left & Right (ARINC 429)							
28.	VOR-ILS Input Freq. (VOR-ILS mode identification)	034 (Bit 14) 1 = ILS 0 = VOR	NA	5	NA	0.01 Mhz	
29.	LOC Dev.	173	± 0.4 DDM	2 0	NA	0.0002 DDM	
30.	GS Dev	174	± 0.8 DDM	2 0	NA	0.0004 DDM	
31.	VOR Bearing	222	±180 deg	2 0	NA	0.09 deg	
DME Left & Right (ARINC 429)							
32.	All ARINC Labels from DME Sensors						
FMS Left & Right (ARINC 429)							
33.	All ARINC Labels from FMS						
ACMSP (ARINC 429)							

Sl. No.	Input Signal	Label	Range	Update Rate (Hz)	Accuracy/required	Resolution required	Remarks
34.	All Button presses, Button statuses, Annunciation Status, Maintenance Word	273	NA	40	NA	NA	NA
Left PFD (ARINC 429)							
35.	LH Selected Course #1	100	±180deg	NA	NA	NA	NA
36.	LH Selected Heading	101	±180deg	NA	NA	NA	NA
37.	LH Selected Altitude	102	65536ft	NA	NA	NA	NA
38.	LH Selected Course #2	110	±180deg	NA	NA	NA	NA
39.	LH Decision Height	170	7000ft	NA	NA	NA	NA
40.	LH Course Datum	302	±180deg	NA	NA	NA	NA
41.							
Right PFD (ARINC 429)							
42.	RH Selected Course #1	100	±180deg	NA	NA	NA	NA
43.	RH Selected Heading	101	±180deg	NA	NA	NA	NA
44.	RH Selected Altitude	102	65536ft	NA	NA	NA	NA
45.	RH Selected Course #2	110	±180deg	NA	NA	NA	NA
46.	RH Decision Height	170	7000ft	NA	NA	NA	NA
47.	RH Course Datum	302	±180deg	NA	NA	NA	NA

Appendix E
SARAS Mk II Environmental Map

Sl. No.	Tests (RTCA/DO-160 Section)	Type of Tests	Severity	Category	Controlled Environment	Uncontrolled Environment	Remarks
1	Temperature and Altitude (Section 4)	4.1 Ground Survival Low Temperature and Short time operating Low Temperature Refer Fig 4-1 (D0160 G)	Ground Survival Low Temp: -55°C	A1	Controlled		
			Short Time operating Low Temp : -40°C				
			Ground Survival Low Temp: -55°C	C4		Uncontrolled	
			Short Time operating Low Temp : -40°C				
		4.2 Operating Low Temperature Refer Fig 4-2 (D0160 G)	Temp: -15°C	A1	Controlled		
			Temp: -40°C	C4		Uncontrolled	
		4.3 Ground Survival High Temperature and Short-Time Operating High Temperature	Ground Survival High Temp: +85°C Short Time operating high Temp: +55°C	A1	Controlled		

Sl. No.	Tests (RTCA/DO-160 Section)	Type of Tests	Severity	Category	Controlled Environment	Uncontrolled Environment	Remarks
		Refer Fig 4-3 (D0160 G)	Ground Survival High Temp: +85 °C Short Time operating high Temp: +55°C	C2		Uncontrolled	
		4.4 Operating High Temperature	Temp: +55 °C	A1	Controlled		
		Refer Fig 4-4 (D0160 G)	Temp: +55°C	C4		Uncontrolled	
		4.5 Altitude Test	Temp: Ambient Equipment 'ON'	A1	Controlled		
		Refer Fig 4-5 (D0160 G)	Pressure corresponding to 15000 ± 100 ft(57.18 kPa or 16.89 in Hg, absolute for Cat A1)				
			35000ft	C2		Uncontrolled	
		4.6 Decompression	Equipment: ON Temp: Ambient Pressure: Equivalent from 8000 ft (2,400 m (75.26 kPa, absolute) reduce to 35,000 ft (10,700 m) (23.84 kPa) in 15 sec.	A1	Controlled		
2	Temperature Variation (Section 5)	Refer Fig 5-1 (D0160 G)	Temp: -15°C(OLT) to +55°C(OHT) Rate of change of Temp: 2 deg C minimum per minute	C	Controlled		
			Temp: -40°C (OLT) to	B		Uncontrolled	

Sl. No.	Tests (RTCA/DO-160 Section)	Type of Tests	Severity	Category	Controlled Environment	Uncontrolled Environment	Remarks
			+55°C (OHT) Rate of Change of Temp: 5 deg C minimum per minute				
3	Humidity (Section 6)	Standard humidity Refer Fig 6-1 (D0160 G)	Temp: 38±2°C to 50±2°C Humidity : 85±4 % RH to 95±4 % RH	A	Controlled		
		External humidity Refer Fig 6-3 (D0160 G)	Temp: 38±2°C to 55±2°C Humidity: 85±4 % RH to 95±4 % RH	C		Uncontrolled	
4	Operational Shock & Crash safety (Section 7)	7.1 Operational Shock	6 g Saw tooth 11ms, Impulse	B	Controlled	Uncontrolled	
		7.2.1 Crash safety (Impulse)	20 g Saw tooth 11 ms, Impulse.				
		7.2.2 Crash safety Sustained (Structural linear acceleration)	18 g in all direction for Random orientation Or Fwd: 18g; Aft: N/A; Up: 3g; Dn: N/A; L&R: 4.5g for fixed orientation.				
5	Vibration (Section 8)	Standard Sinusoidal Vibration Refer Fig 8-1 (D0160 G)	Curve M: 0.1 inch displacement from 5 to 15 Hz , 0.01 inch displacement 15 to 55 Hz and from 55 to 500 Hz 1.5 g Pk	S	Controlled	Uncontrolled	

Sl. No.	Tests (RTCA/DO-160 Section)	Type of Tests	Severity	Category	Controlled Environment	Uncontrolled Environment	Remarks
6	Explosive Atmosphere Proofness (Section 9)	Not applicable					
7	Water Proofness (Section 10)	Condensing Water Proof Test	Low Temp: -10 °C for 3 Hrs High Temp: +40 °C and 85% humidity for 10 min Transition time: Low temp chamber to High temp chamber within 5 minute.	Y	Controlled	Uncontrolled	If the test is not done, OEM shall provide Analysis/Similarity and the justification why this test is not required for SARAS.
8	Fluid Susceptibility (Section 11)	Not applicable	Not applicable	Not applicable			
9	Sand and Dust (Section 12)	Blowing Dust	Air Velocity 0.5 m/sec to 2.4 m/s, RH≤30% Dust: 97% to 99% silicon dioxide Dust concentration 3.5 to 8.8 g/m ³ Size distributions of 100% by weight less than 150 flm, with a median diameter (50 ±2 % by weight) of 20 ±5 flm	D	Not applicable	Uncontrolled	If the test is not done, OEM shall provide Analysis/Similarity and the justification why this test is not required for SARAS.
11	Fungus Resistance (Section 13)		The spore suspension will be prepared using fungi specified below Fungi Spores: ATCC a) Aspergillus niger: 9642	F	Controlled	Uncontrolled	If the test is not done, OEM shall provide Analysis/Similarity, the analysis for the material used and the justification why

Sl. No.	Tests (RTCA/DO-160 Section)	Type of Tests	Severity	Category	Controlled Environment	Uncontrolled Environment	Remarks
			b) Aspergillus flavus: 9643 c) Aspergillus versicolor: 11730 d) Penicilliumfuniculosum: 11797 e)Chaetomiumglobosum: 6205				this test is not required for SARAS.
1	Salt Fog (Section 14)		NaCl Salt solution of 5% concentration Ambient temperature 35 ±2 °C Ensure the fallout is between 1 and 3 ml/80 cm ² /hr with a pH between 6.5 and 7.2. - 24 Hrs exposure & - 24 Hrs drying constitute one cycle	S	Controlled	Uncontrolled	If the test is not done, OEM shall provide Analysis/Similarity and the justification why this test is not required for SARAS.
1	Magnetic Effect Test (Section 15)		Distance at which the 1 degree (1°) deflection is observed. For Category Z equipment 0 < D ≤ 0.3m. For Category A Equipment 0.3 < D ≤ 1m.	Z Cockpit	Controlled		
				A Avionics bay		Uncontrolled	

Sl. No.	Tests (RTCA/DO-160 Section)	Type of Tests	Severity	Category	Controlled Environment	Uncontrolled Environment	Remarks
1	Power Input (Section 16)	Ripple Voltage	Nominal voltage: 28 V Dc. Cyclic peak-to-peak dc ripple voltage $\leq 4V$ (for equipment terminals is above or equal to 22 V) Ripple voltage $\leq 2 V$ (for equipment terminals Voltage < 22 V)	B	Controlled	Uncontrolled	
		Momentary Power Interruptions (dc)	Interrupt period : 50 ms	B	Controlled	Uncontrolled	
		Normal Surge Voltage (dc)	Nominal voltage: 28 V Dc Increase the voltage to 47 V dc -0/+2 V dc for 5 ms then decrease the voltage to 40 V dc -0/+2 V dc for 30 ms. Rise time: within 1 ms, Fall time: within 5 ms Decrease the voltage to 17 V dc -0.7/+0 V dc. Return the voltage to 28 V dc for five seconds. Change of voltage: within 1 ms. Decrease the voltage to 18 V dc -0.7/+0 V dc for Emergency equipment.	B	Controlled	Uncontrolled	
		Engine Starting Under Voltage Operation (dc)	Equipment energized at nominal rated voltage, decrease the input voltage to 10.0 V dc and increase 0.30 volts per second for 35 seconds, then return to rated	B	Controlled	Uncontrolled	

Sl. No.	Tests (RTCA/DO-160 Section)	Type of Tests	Severity	Category	Controlled Environment	Uncontrolled Environment	Remarks
			voltage.				
		Momentary Undervoltage Operation (dc)	With the equipment energized at nominal rated voltage, decrease the input dc voltage to 12.0 V +/- 0.24 V for seven seconds.	B	Controlled	Uncontrolled	
		Abnormal Surge Voltage (dc) Refer Fig 16-6 (D0160 G)	With the equipment operating at its appropriate nominal voltage, apply to the positive (dc) input lead voltage surges of 60 - 0/+3 V dc for 100 ms and then reduce the voltage to 40 -0/+2 V dc for one second. Surge Limits: 32.2 V for 5 sec; 40 V for 1 sec; 47 V for 0.5sec; 60 V for 0.1 sec;	B	Controlled	Uncontrolled	
1.	Voltage spike (Section 17)	Refer Fig 17-1 (D0160 G)	Primary power input a series of positive and negative spikes. Equipment intended primarily for installation where a high degree of protection against damage by voltage spikes is required.	A	Controlled	Uncontrolled	

Sl. No.	Tests (RTCA/DO-160 Section)	Type of Tests	Severity	Category	Controlled Environment	Uncontrolled Environment	Remarks
1	Audio Frequency and conducted Susceptibility (Section 18)	Refer Fig 18-4 (D0160 G)	Equipment operating, apply a sine wave audio frequency signal successively in series with each ungrounded dc input power lead.	B	Controlled	Uncontrolled	
1	Induced Signal Susceptibility (Section 19)	Magnetic fields induced into the equipment	20A rms at 400Hz	ZCE, ACE& BCE Critical LRUs: ZC Non Critical LRUs: AC	Controlled	Uncontrolled	
		Electric fields induced into the equipment	170V rms at 400Hz	ZCE, ACE & BCE	Controlled	Uncontrolled	
		Magnetic fields induced into interconnecting cables	I _x L=30 A-m at 400Hz reducing to 0.8 A-m at 15kHz Ref Fig 19-1(a) (D0160G)	ZCE	Controlled	Uncontrolled	
			I _x L=18 A-m at 380-420Hz Ref Fig 19-1(a) (D0160G)	ACE			
		Electric fields induced into interconnecting cables	V _x L=1800 V-m from 380 to 420Hz Ref Fig 19-1(d) (D0160G)	ZCE	Controlled	Uncontrolled	
			V _x L=360 V-m from 380 to 420Hz	ACE			

Sl. No.	Tests (RTCA/DO-160 Section)	Type of Tests	Severity	Category	Controlled Environment	Uncontrolled Environment	Remarks
			Ref Fig 19-1(d) (D0160G)				
		Spikes induced into interconnecting cables	Cable length: 3m Amplitude 600V p-p Total duration 50-1000µs Repetition rate 0.2 to 10 µs.	ZCE, ACE, BCE	Controlled	Uncontrolled	
1	Radio Frequency Susceptibility (Section 20)	Conducted Susceptibility Ref Fig 20-6 (D0160G)	10 kHz to 400 MHz Category W: (3 to 150mA) Category R: (0.6 to 30mA) Category T: (0.15 to 7.5mA)	Category W, R & T W- For Flight Critical LRUs R- Mission Critical LRUs T- Other LRUs	Controlled	Uncontrolled	
		Radiated Susceptibility Ref Fig 20-10 (a & b) (D0160G)	Category W: 100 MHz to 18 GHz- 100V/m Category R: From 100 MHz to 400 MHz - 20 V/m From 400 MHz to 8 GHz - 150 V/m Category T: 100 MHz to 8GHz-5V/m				
1	Emission of Radio Frequency Energy (Section 21)	Conducted RF Emission	150 KHz to 152 MHz Power Lines Ref Fig 21-1 (D0160G) 150 KHz to 152 MHz Bundles Ref Fig 21-2 (D0160G)	M	Controlled		
				L		Uncontrolled	
		Radiated RF Emission	100 MHz to 6000 MHz. Ref Fig 21-7 (D0160G) (for equipment installed in Avionics bay or	M	Controlled		

Sl. No.	Tests (RTCA/DO-160 Section)	Type of Tests	Severity	Category	Controlled Environment	Uncontrolled Environment	Remarks
			equipment rack.)				
			Ref Fig 21-8 (DO160G) (forequipment installed in Cockpit/Instrument panel and Passenger cabin.)	L		Uncontrolled	
1	Lightning Induced Transient Susceptibility (Section 22)	B: Aperture & resistance coupling; K: Shielded aperture & resistance coupling; L: Cable bundle Multiple burst.		B3K3L3	Controlled	Uncontrolled	
		Pin Injection Tests:	Waveform:3 (1 MHz \pm 20%), Voc/Isc:600 / 24 (+10%, -0%) Ref Fig 22-3 (DO160G) Waveform:5A, 300/300 (+10%, -0%). Ref Fig 22-5 (DO160G)				
		Cable bundle Multiple burst:					
		Waveform:3 (1 MHz and 10 MHz \pm 20%), Single Stroke Ref Fig 22-3 (DO160G)	V _T / I _L :600 / 120 (+20%, -0%)	B3K3L3	Controlled	Uncontrolled	

Sl. No.	Tests (RTCA/DO-160 Section)	Type of Tests	Severity	Category	Controlled Environment	Uncontrolled Environment	Remarks
		Waveform:3 (1 MHz and 10 MHz $\pm 20\%$), Multiple Stroke Ref Fig 22-7(D0160G)	First Stroke: 600 / 120 (+20%, -0%) Subsequent Stroke: 300 / 60 (+50%, -0%)				
		Waveform:3 (1 MHz and 10 MHz $\pm 20\%$) Multiple Burst: Ref Fig 22-8(D0160G)	360 / 6 (+20%, -0%)				
		Waveform: 5A Single Stroke: Ref Fig 22-5(D0160G)	V_T / I_L :300 / 1000 (+20%, -0%)				
		Waveform: 5A Multiple Stroke Ref Fig 22-7(D0160G)	First Stroke: 120 / 400 (+20%, -0%) Subsequent Stroke: 60 / 200 (+50%, -0%)				
2	Lightning Direct Effect (Section 23)	Not applicable					
2	Icing (Section 24)	Not applicable					
2	Electrostatic Discharge (Section 25)		Electrostatic discharge pulses at a test level of 15,000 volts.	A	Controlled	Uncontrolled	
2	Fire, Flammability (Section 26)	Not applicable					

CHAPTER-5

PRICE SCHEDULE FORMS

Bidder should quote as per the BOQ Format Only as uploaded in <https://etenders.gov.in>

The Bidders should have Java 8 update 231 version-32 bit for uploading the bid in the CPP Portal.

Note:

- i. The Bidder may fill the BoQ (Price Schedule Form) and enclose as per Clause 1.10 and 1.18.3 of the Bidding documents.
- ii. The Bidders have to fill in the BoQ (Price Schedule) as per table below for the Goods Being Offered from India.

For Goods Being Offered From India									
Sub-Total:Ex-Works Price	1	Nos	INR	0			0	0	INR Zero Only
Less: Discount (if any)	1	Nos	INR				0	0	INR Zero Only
Sub-Total:	1	Nos	INR	0			0	0	INR Zero Only
Less: Buy-back Price (if any)	1	Nos	INR				0	0	INR Zero Only
Sub-Total:Net Ex-Works Price	1	Nos	INR	0			0	0	INR Zero Only
Add: Packing & Forwarding charges (if any)	1	Nos	INR				0	0	INR Zero Only
Add: Transportation Charges (if any)	1	Nos	INR				0	0	INR Zero Only
Add: Insurance charges (from warehouse-to-warehouse) (if any)	1	Nos	INR				0	0	INR Zero Only
Total (A):	1	Nos	INR	0			0	0	INR Zero Only
Installation & Commissioning charges (if any)	1	Nos	INR				0	0	INR Zero Only
Training charges (if any)	1	Nos	INR				0	0	INR Zero Only
Total (B):	1	Nos	INR	0			0	0	INR Zero Only
Bank Charges, if any	1	Nos	INR				0	0	INR Zero Only
Any other charges, if any	1	Nos	INR				0	0	INR Zero Only
Grand Total (For Goods Being Offered From India)	1	Nos	INR	0			0	0	INR Zero Only

- iii. The Non-Relevant Cells in Column M have to be filled with 0 (Zero) before Uploading the BoQ.
- iv. The Bidders have to fill in the BoQ (Price Schedule) as per table below for the Goods Being Offered from Abroad.

For Goods Being Offered From Abroad (fields below - Mandatory for Foreign Vendors)									
Sub-Total:Ex-Works Price	1	Nos	INR	0			0	0	INR Zero Only
Less: Discount (if any)	1	Nos	INR				0	0	INR Zero Only
Sub-Total:	1	Nos	INR	0			0	0	INR Zero Only
Add: FOB /FCA Charges	1	Nos	INR				0	0	INR Zero Only
Sub-Total: FCA/FOB International gateway Airport	1	Nos	INR	0			0	0	INR Zero Only
Add: Freight upto Bengaluru Airport	1	Nos	INR				0	0	INR Zero Only
Total (A): CIP/CIF Charges	1	Nos	INR	0			0	0	INR Zero Only
Installation & Commissioning charges (if any) at CSIR-NAL	1	Nos	INR				0	0	INR Zero Only
Training charges (if any) at CSIR-NAL	1	Nos	INR				0	0	INR Zero Only
Any other charges, if any	1	Nos	INR				0	0	INR Zero Only
Grand Total - CIP Bengaluru (For Goods Being Offered From Abroad)	1	Nos	INR	0			0	0	INR Zero Only

- v. The Currency column has a drop down menu to select appropriate denomination.

CHAPTER-6

Qualification Requirements

Criteria 1 - Experience and Past Performance:

- a) The bidder (manufacturer or principal of authorized representative – hereinafter referred simply as 'The Bidder') should have regularly for at least the last 3 years, ending 31st March 2020 of the previous financial year (hereinafter called 'The relevant Date'), manufactured and supplied (/erected/ commissioned FAR 23 compliant Avionics Suite with the same or higher specifications having/with Design parameters (hereinafter called 'The Product'). The bidder should submit the manufacturer authorization form as appended in Chapter-8 and
- b) 'The bidder' should have manufactured and supplied (/erected/commissioned) at least 10 numbers (herein after referred as 'The Qualifying Quantity') of 'The Product' in at least one of the last five years ending on 'The relevant Date', and out of which at least 02 numbers of similar version/model of 'The product' should be in successful operation for at least 01 years on the date of bid opening.

Criteria 2 - Capability- Equipment & manufacturing Facilities:

'The bidder' must have an annual capacity to manufacture and supply (/erected/ commissioned) at least 10 (The Qualifying Quantity)

Criteria 3 - Financial Standing – under all conditions

- a) The average annual financial turnover of 'The bidder' during the last three years, ending on 'The relevant Date', should be at ₹30 crores as per the annual report (audited balance sheet and profit & loss account) of the relevant period, duly authenticated by a Chartered Accountant/Cost Accountant in India or equivalent in relevant countries.

Ministry of MSME have clarified that all Central Ministries/Departments/Central Public Section Undertakings may relax condition of prior turnover and prior experience with respect to Micro and Small Enterprises in all public procurements subject to meeting of quality and technical specifications. Further, the condition of prior turnover and prior experience may be relaxed for Start-ups (as defined by Department of Industrial Policy and Promotion) subject to meeting of quality & technical specifications and making suitable provisions in the bidding document (rule 173 (i) of GFR 2017))

- b) The net worth of the Bidder firm (manufacturer or principal of authorized representative) should not be negative on 'The Relevant Date' and also ii) should have not eroded by more than 30% (thirty percent) in the last three years, ending on 'The Relevant Date'.

Note: In case of Indian Bidders/companies (manufacturer or principal of authorized representative) who have been restructured by Banks in India, under the statutory guidelines, they would be deemed to have qualified the Financial standing criteria considering the institutional financial backing available to them.

Applicability in Special Cases:

- a) Applicability to 'Make in India': Bidders (manufacturer or principal of authorised representative) who have a valid/approved ongoing 'Make in India' agreement/ program and who while meeting all other criteria above, except for any or more of sub-criteria in Experience and Past Performance above, would also be considered to be qualified provided:

i)	their foreign 'Make-in-India' associates meet all the criteria above without exemption, and
ii)	the Bidder submits appropriate documentary proof for a valid/approved ongoing 'Make in India' agreement/program.
iii)	the bidder (manufacturer or principal of authorised representative) furnishes along with

	the bid a legally enforceable undertaking jointly executed by himself and such foreign Manufacturer for satisfactory manufacture, Supply (and erection, commissioning if applicable) and performance of 'The Product' offered including all warranty obligations as per the general and special conditions of contract.
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- b) Authorized Representatives: Bids of bidders quoting as authorised representative of a principal manufacturer would also be considered to be qualified, provided:

i)	their principal manufacturer meets all the criteria above without exemption, and
ii)	the principal manufacturer furnishes a legally enforceable tender-specific authorisation in the prescribed form assuring full guarantee and warranty obligations as per the general and special conditions of contract; and
iii)	the bidder himself should have been associated, as authorised representative of the same or other Principal Manufacturer for same set of services as in present bid (supply, installation, satisfactorily commissioning, after sales service as the case may be) for same or similar 'Product' for past three years ending on 'The Relevant Date'.

- c) Joint Ventures and Holding Companies: Credentials of the partners of Joint ventures cannot (repeat cannot) be clubbed for the purpose of compliance of PQC in supply of Goods/Equipment, and each partner must comply with all the PQC criteria independently. However, for the purpose of qualifying the Financial Standing Criteria, the Financial Standing credentials of a Holding Company can be clubbed with only one of the fully owned subsidiary bidding company, with appropriate legal documents proving such ownership.

Note for Bidders:

- a) 'Doctrine of Substantial Compliance': The Pre-Qualification Bidding (PQB) and Pre- Qualification Criteria (PQC) are for shortlisting of sources who are competent to perform this contract to ensure best value for money from expenditure of Public Money. This process is neither intended to bestow any entitlement upon nor to create any rights or privileges for the Bidders, by way of overly hair-splitting or viciously legalistic interpretations of these criteria, disregarding the very rationale of the PQB and PQC. Keeping this caveat in view, interpretation by the Purchaser would be based on common usage of terminologies and phrases in public procurement in accordance with the 'Doctrine of Substantial Compliance' and would be final.
- b) The Bidder must declare, whether asked or not in a bid document, any previous transgressions of such a code of integrity with any entity in any country during the last three years or of being debarred by any other Procuring Entity. Failure to do so would amount to violation of this code of integrity.
- c) In case of agents quoting in offshore procurements, on behalf of their principal manufacturers, one agent cannot represent two manufacturers or quote on their behalf in a particular tender enquiry. One manufacturer can also authorize only one agent/ dealer. There can be only one bid from the following:

i)	The Principal manufacturer directly or through one Indian agent on his behalf; and
ii)	Indian/foreign agent on behalf of only one principal.

- d) Along with all the necessary documents/certificates required as per the tender conditions, the bidder should furnish a brief write-up, backed with adequate data, explaining his available capacity (both technical and financial), for manufacture and supply of the required goods/equipment, within the specified time of completion, after meeting all their current commitments.

e) Supporting documents submitted by the bidder must be certified as follows:

i)	All copy of supply/work order; respective completion certificate and contact details of clients; documents issued by the relevant Industries Department/National Small Industries Corporation (NSIC)/ manufacturing license; annual report, etc., in support of experience, past performance and capacity/capability should be authenticated by the by the person authorized to sign the tender on behalf of the bidder. Original Documents must be submitted for inspection, if so demanded.
ii)	All financial standing data should be certified by certified accountants, for example, Chartered Accountants/Cost Accountants or equivalent in relevant countries; and Indian bidder or Indian counterparts of foreign bidders should furnish their Permanent Account Number.

f) A bidder or any of its affiliates who participated as a consultant in the preparation of the design or technical specifications of the contract i.e. the subject of the bid; cannot participate in the bidding process.

g) Indian agents quoting on behalf of its foreign principal need to submit a copy of the agency agreement with the foreign principal detailing the services to be rendered by them on behalf of the principals, failing which its bid shall not be considered.

(h) Foreign bidders to disclose the name and address of agent and representatives in India and Indian bidder to disclose their foreign principal or associates.

CHAPTER 7

Contract Form

Contract No. _____ Date: _____

THIS CONTRACT AGREEMENT is made
the [insert: number] day of [insert: month], [insert: year].

BETWEEN

- (1) The Council of Scientific & Industrial Research registered under the Societies Registration Act 1860 of the Government of India having its registered office at 2, Rafi Marg, New Delhi-110001, India represented by National Aerospace Laboratories, Bengaluru (hereinafter called “the Purchaser”), and
- (2) [insert name of Supplier], a corporation incorporated under the laws of [insert: country of Supplier] and having its principal place of business at [insert: address of Supplier] (hereinafter called “the Supplier”).

WHEREAS the Purchaser invited bids for certain Goods and ancillary services, viz., [insert brief description of Goods and Services] and has accepted a Bid by the Supplier for the supply of those Goods and Services in the sum of [insert Contract Price in words and figures, expressed in the Contract currency(ies)] (hereinafter called “the Contract Price”).

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

01. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract referred to.
02. The following documents shall constitute the Contract between the Purchaser and the Supplier, and each shall be read and construed as an integral part of the Contract:

(a)	This Contract Agreement
(b)	General Conditions of Contract
(c)	Special Conditions of Contract
(d)	Technical Requirements (including Schedule of Requirements and Technical Specifications)
(e)	The Supplier's Bid and original Price Schedules
(f)	The Purchaser's Notification of Award
(g)	[Add here any other document(s)]

03. This Contract shall prevail over all other Contract documents. In the event of any discrepancy or inconsistency within the Contract documents, then the documents shall prevail in the order listed above.
04. In consideration of the payments to be made by the Purchaser to the Supplier as hereinafter mentioned, the Supplier hereby covenants with the Purchaser to provide the Goods and Services and to remedy defects therein in conformity in all respects with the provisions of the Contract.
05. The Purchaser hereby covenants to pay the Supplier in consideration of the provision of the Goods and Services and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of Union of India on the day, month and year indicated above.

For and on behalf of the Council of Scientific & Industrial Research

Signed : [insert signature]
in the capacity of [insert title or other appropriate designation]
in the presence of [insert identification of official witness]

Signed : [insert signature]
in the capacity of [insert title or other appropriate designation]
in the presence of [insert identification of official witness]

For and on behalf of the Supplier

Signed : [insert signature of authorized representative(s) of the Supplier]
in the capacity of [insert title or other appropriate designation]
in the presence of [insert identification of official witness]

CHAPTER 8

Other Standard Forms

(To be enclosed as indicated below)

TABLE OF CONTENTS

Sl. No.	Name	Annexure
1	Bid Security Form (to be enclosed with the technical bid) [NOT APPLICABLE AS PER GOVT. ORDERS]	A
2	Bid Securing Declaration. (to be enclosed with the technical bid)	B
3	Bidder Information Form (to be enclosed with the technical bid)	C
4	Manufacturers' Authorization Form (to be enclosed with the technical bid)	D
5	Performance Statement Form (to be enclosed with the technical bid)	E
6	Service Support Detail Form (to be enclosed with the technical bid)	F
7	Format of declaration of abiding by the code of integrity and conflict of interest to be submitted by the bidder (to be enclosed with the technical bid)	G
8	Deviation Statement Form (to be enclosed with the technical bid)	H
9	Bid Form (to be enclosed with the priced bid)	I
10	Performance Security Form (to be submitted on award of Contract)	J
11	Acceptance Certificate Form (to be submitted on award of Contract)	K
12	Integrity Pact (to be enclosed with the technical bid) To be executed on Company's Letterhead duly stamped and signed	L

Note: Please refer clause 1.10.1 of the bidding documents for other documents to be attached with the bids/offers

BID SECURITY FORM

Whereas

(hereinafter called the tenderer)

has submitted their offer dated
for the supply of

(hereinafter called the tender)

Against the Purchaser's Tender
No. _____

KNOW ALL MEN by these presents that WE
of _____ having our registered office
at _____ are bound unto _____ (hereinafter called the
"Purchaser")

In the sum of _____

For which payment will and truly to be made to the said Purchaser, the Bank binds itself, its successors and assigns by these presents. Sealed with the Common Seal of the said Bank this _____ day of _____ 20____.

THE CONDITIONS OF THIS OBLIGATION ARE:

(1)	If the tenderer withdraws or amends or modifies or impairs or derogates from the Tender in any respect within the period of validity of this tender OR
(2)	If the tenderer having been notified of the acceptance of his tender by the Purchaser during the period of its validity
(a)	If the tenderer fails to furnish the Performance Security for the due Performance of the contract.
(b)	Fails or refuses to accept/execute the contract.

We undertake to pay the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that in its demand the Purchaser will note that the amount claimed by it is due to it owing to the occurrence of one or both the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force up to and including 45 days after the period of tender validity and any demand in respect thereof should reach the Bank not later than the above date.

Bank)

(Signature of the authorized officer of the

Branch

Name and designation of the officer
Seal, name & address of the Bank and address of the

Note: Whenever the bidder chooses to submit the Bid Security in the form of Bank Guarantee, then he should advise the banker issuing the Bank Guarantee to immediately send by Registered Post (A.D.) an unstamped duplicate copy of the Guarantee directly to the Purchaser with a covering letter to compare with the original BG for the correctness, genuineness, etc.

Tender No.:

BID-SECURING DECLARATION FORM

Date: _____

Bid No. _____

To (insert complete name and address of the purchaser)

I/We. The undersigned, declare that:

I/We understand that, according to your conditions, bids must be supported by a Bid Securing Declaration.

I/We accept that I/We may be disqualified from bidding for any contract with you for a period of one year from the date of notification if I am /We are in a breach of any obligation under the bid conditions, because I/We

(a)	have withdrawn/modified/amended, impairs or derogates from the tender, my/our Bid during the period of bid validity specified in the form of Bid; or
(b)	having been notified of the acceptance of our Bid by the purchaser during the period of bid validity
	(i) fail or reuse to execute the contract, if required, or
	(ii) fail or refuse to furnish the Performance Security, in accordance with the Instructions to Bidders.

I/We understand this Bid Securing Declaration shall cease to be valid if I am/we are not the successful Bidder, upon the earlier of (i) the receipt of your notification of the name of the successful Bidder; or (ii) thirty days after the expiration of the validity of my/our Bid.

Signed: (insert signature of person whose name and capacity are shown)
in the capacity of (insert legal capacity of person signing the Bid Securing Declaration).

Name: (insert complete name of person signing the Bid Securing Declaration)

Duly authorized to sign the bid for an on behalf of: (insert complete name of Bidder)

Dated on _____ day of _____ (insert date of signing)

Corporate Seal (where appropriate)

(Note: In case of a Joint Venture, the Bid Securing Declaration must be in the name of all partners to the Joint Venture that submits the bid)

BIDDER INFORMATION FORM

- (a) *[The Bidder shall fill in this Form in accordance with the instructions indicated below. No alterations to its format shall be permitted and no substitutions shall be accepted. This should be done of the letter head of the firm]*

Date : *[insert date (as day, month and year) of Bid Submission]*

Tender No : *[insert number from Invitation for bids]*

01.	Bidder's Legal Name <i>[insert Bidder's legal name]</i>
02.	In case of JV, legal name of each party: <i>[insert legal name of each party in JV]</i>
03.	Bidder's actual or intended Country of Registration: <i>[insert actual or intended Country of Registration]</i>
04.	Bidder's Year of Registration: <i>[insert Bidder's year of registration]</i>
05.	Bidder's Legal Address in Country of Registration: <i>[insert Bidder's legal address in country of registration]</i>
06.	<p>Bidder's Authorized Representative Information</p> <p>Name: <i>[insert Authorized Representative's name]</i></p> <p>Address: <i>[insert Authorized Representative's Address]</i></p> <p>Telephone/Fax numbers: <i>[insert Authorized Representative's telephone/fax numbers]</i></p> <p>Email Address: <i>[insert Authorized Representative's email address]</i></p>
07.	<p>Attached are copies of original documents of:</p> <p>Articles of Incorporation or Registration of firm named in 1, above.</p>

Signature of Bidder _____

Name _____

Business Address _____

MANUFACTURERS' AUTHORIZATION FORM

[The Bidder shall require the Manufacturer to fill in this Form in accordance with the instructions indicated. This letter of authorization should be on the letterhead of the Manufacturer and should be signed by a person with the proper authority to sign documents that are binding on the Manufacturer.]

Date : *[insert date (as day, month and year) of Bid Submission]*

Tender No. : *[insert number from Invitation For Bids]*

To : *[insert complete name and address of Purchaser]*

WHEREAS

We *[insert complete name of Manufacturer]*, who are official manufacturers of *[insert type of goods manufactured]*, having factories at *[insert full address of Manufacturer's factories]*, do hereby authorize *[insert complete name of Bidder]* to submit a bid the purpose of which is to provide the following Goods, manufactured by us *[insert name and or brief description of the Goods]*, and to subsequently negotiate and sign the Contract.

We hereby extend our full guarantee and warranty in accordance with Clause 2.20 of the General Conditions of Contract, with respect to the Goods offered by the above firm.

Signed: *[insert signature(s) of authorized representative(s) of the Manufacturer]*

Name: *[insert complete name(s) of authorized representative(s) of the Manufacturer]*

Title: *[insert title]*

Duly authorized to sign this Authorization on behalf of: *[insert complete name of Bidder]*

Dated on _____ day of _____, _____ *[insert date of signing]*

PERFORMANCE STATEMENT FORM**Details of similar equipment / systems supplied & installed during past 3 years in India & Abroad**

Tender No.:

Name of the Bidder_____

Order Placed by (full address of Purchaser)	Order No. and date	Description and quantity of ordered equipment	Value of order	Date of completion of deliver as per contract	Date of actual completion of delivery	Remarks indicating reasons for late delivery, if any	Has the equipment been installed/ working satisfactory? (Attach a certificate from the purchaser / Consignee)	Name of Contact person along with Telephone No., Fax No. and e-mail address

Signature and Seal of the manufacturer/Bidder

Place :

Date :

Tender No.:

SERVICE SUPPORT DETAIL FORM

Sr. No.	List of similar type of equipment's serviced in the past 3 years	Address, Telephone Nos., Fax No. and e-mail address of the buyer	Nature of training Imparted/ service provided	Name and address of service provider

Signature and Seal of the manufacturer/Bidder.....

Place :

Date :

Format for declaration by the Bidder for Code of Integrity & conflict of interest
(On the Letter Head of the Bidder)

Ref. No: _____

Date _____

To,

(Name & address of the Purchaser)

Sir/Madam,

With reference to your Tender No. _____ dated _____ I/We hereby declare that we shall abide by the Code of Integrity for Public Procurement as mentioned under Para 1.3.0 of ITB of your Tender document and have no conflict of interest.

The details of any previous transgressions of the code of integrity with any entity in any country during the last three years or of being debarred by any other Procuring Entity are as under:

- a
- b
- c

We undertake that we shall be liable for any punitive action in case of transgression/ contravention of this code.

Thanking you,

Yours sincerely,

Signature
(Name of the Authorized Signatory)
Company Seal

Tender No.:

DEVIATION STATEMENT FORM**PART –I**

The following are the particulars of deviations from the requirements of the tender specifications:

Sl.No.	Name of Specifications/ Parts/Accessories of Tender Enquiry	Specifications of quote Model / Part / Accessory	Compliance whether YES/NO	Deviation, if any to be indicated in unambiguous terms (The compliance/ Deviation should be supported by relevant Technical Literature)	Technical justification for the deviation, if any. If specification is superior / inferior than asked for in the enquiry, it should be clearly brought out in the justification

Signature of Bidder

- If the Bidder offers more than one model, then the Compliance Statement must be enclosed for each and every model separately.
- The Technical and Commercial deviations should be indicated separately.
- If the Bidder fails to enclose the compliance statement, his bid is likely to be rejected.

Place:

Date:

Signature and seal of the Manufacturer/Bidder

NOTE:

Where there is no deviation, the statement should be returned duly signed with an endorsement indicating **"No Deviations"**.

Tender No.:

PART – II**(Refer Clause 1.26 of Tender Document, Chapter-6 & Chapter-7)**

Sr. No.	Tender Clause No./ Chapter/Annexure	Tender Requirement	Compliance	Document Submitted
1	ITB 1.16 Chapter 7:Annexure-A	EMD (to be valid till 45 days beyond the validity of Bid)	Yes / No	Yes / No
2	Chapter-7, Annexure-B	Bid Securing Declaration Form	Yes / No	Yes / No
3	ITB 1.18	Bid is Signed	Yes / No	Yes / No
4	ITB 1.17	Bid Validity (90 days after the date of Bid opening)	Yes / No Bid Valid upto.....	Yes / No
5	Chapter 7: Annexure –C	Bidder Information Form enclosed	Yes / No	Yes / No
6	Chapter 7: Annexure-D	Manufacturers Authorisation Form (MAF) (If Applicable) enclosed	Yes / No	Yes / No
7	Chapter 7 - Annexure E	Performance Statement Form enclosed	Yes / No	Yes / No
8	Chapter 7: Annexure F	Service Support details enclosed	Yes / No	Yes / No
9	Chapter 7: Annexure-G	Declaration-Code of Integrity	Yes / No	Yes / No
10	Chapter 7:Annexure H - Part I & Part II	Deviation Statement Form enclosed	Yes / No	Yes / No
11	Chapter 7: Annexure-L	Integrity Pact	Yes / No	Yes / No
12	GCC/SCC 2.21	Warranty: As per SCC & Chapter-4	Yes / No	Yes / No
13	GCC/SCC 2.13	Agree to submit Performance Security 10% of PO Value	Yes / No	Yes / No
14	Chapter 3	Schedule of Requirement	Yes / No	Yes / No
15	Chapter 7: Annexure-I	Bid Form enclosed	Yes / No	Yes / No
16	Terms and Conditions		Yes / No	Yes / No

The Bidder should submit other documents such as fulfillment of financial qualification criteria, Schedule of Requirement (Chapter-3) and various forms as specified in Chapter-8.

Bid Form

[The Bidder shall fill in this Form in accordance with the instructions indicated No alterations to its format shall be permitted and no substitutions shall be accepted.]

Date : [insert date (as day, month and year) of Bid Submission]

Tender No. :

To : Director, CSIR-NAL, Bengaluru

We, the undersigned, declare that:

(a)	We have examined and have no reservations to the Bidding Documents, including Addenda No.: [insert the number and issuing date of each Addenda]
(b)	We offer to supply in conformity with the Bidding Documents and in accordance with the Delivery Schedules specified in the Schedule of Requirements the following Goods and Related Services [insert a brief description of the Goods and Related Services] as specified in Chapter 4
(c)	The total price of our Bid, excluding any discounts offered in item (d) below, is: [insert the total bid price in words and figures, indicating the various amounts and the respective currencies]
(d)	The discounts offered and the methodologies for their application are: Discounts. If our bid is accepted, the following discounts shall apply. [Specify in detail each discount offered and the specific item of the Schedule of Requirements to which it applies.]
(e)	Our bid shall be valid for the period of time specified in ITB Clause 1.17.1, from the date fixed for the bid submission due date in accordance with ITB Clause 1.19 and it shall remain binding upon us and may be accepted at any time before the expiration of that period
(f)	If our bid is accepted, we commit to obtain a performance security in accordance with ITB Clause 1.43 and GCC Clause 2.13 for the due performance of the Contract and also submit order acceptance within 14 days from the date of contract in accordance with ITB Clause 1.42 and GCC Clause 2.44;
(g)	The following commissions, gratuities, or fees have been paid or are to be paid with respect to the bidding process or execution of the Contract: [insert complete name of each Recipient, its full address, the reason for which each commission or gratuity was paid and the amount and currency of each such commission or gratuity]

Name of Recipient	Address	Reason	Amount
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

(If none has been paid or is to be paid, indicate "none.")

(h)	We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed.
(i)	We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.

Signed : [insert signature of person whose name and capacity are shown]

In the capacity of [insert legal capacity of person signing the Bid Submission Form]

Name : [insert complete name of person signing the Bid Submission Form]

Duly authorized to sign the bid for and on behalf of: [insert complete name of Bidder]

Dated on _____ day of _____, _____ [insert date of signing]

Tender No.:

PERFORMANCE SECURITY FORM/STAND-BY LETTER OF CREDIT**MODEL BANK GUARANTEE FORMAT FOR PERFORMANCE SECURITY/ STAND-BY LETTER OF CREDIT**

To,

.....

WHEREAS (name and address of the supplier) (hereinafter called "the supplier") has undertaken, in pursuance of contract No. datedto supply (description of goods and services) (herein after called "the contract").

AND WHEREAS it has been stipulated by you in the said contract that the supplier shall furnish you with a bank guarantee by a scheduled commercial bank recognized by you for the sum specified therein as security for compliance with its obligations in accordance with the contract;

AND WHEREAS we have agreed to give the supplier such a bank guarantee;

NOW THEREFORE we hereby affirm that we are guarantors and responsible to you, on behalf of the supplier, up to a total of (amount of the guarantee in words and figures), and we undertake to pay you, upon your first written demand declaring the supplier to be in default under the contract and without cavil or argument, any sum or sums within the limits of (amount of guarantee) as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the supplier before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the contract to be performed there under or of any of the contract documents which may be made between you and the supplier shall in any way release us from any liability under this guarantee and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until the day of, 20.....

(Signature of the authorized officer of the Bank)

.....

Name and designation of the officer

.....

Seal, Name & Address of the Issuing Branch of the Bank

Note:

Whenever, the bidder chooses to submit the Performance Security in the form of Bank Guarantee, then he should advise the banker issuing the Bank Guarantee to immediately send by Registered Post (A.D.) an unstamped duplicate copy of the Guarantee directly to the Purchaser with a covering letter to compare with the original BG for the correctness, genuineness, etc.

Acceptance Certificate					Annexure-K
PO No. NAL/PUR/			Date:		
Sub: Certificate of Supply, Installation, Commissioning, Training and Acceptance of Goods & Services					
1	This is to certify that the equipment as detailed below has/have been received in good condition along with all the standard and special accessories (subject to remarks in Para 2). The same has been installed, commissioned and accepted.				
	(a) Contract No.				
	Date				
	Value				
	Mode of Shipment				
	(b) Description of the Equipment				
	(c) Name of the Consignee		CSIR-NAL, Bengaluru		
	(d) Scheduled date of Delivery of the Consignment to the Laboratory/Institute				
	(e) Details of LC Established				
	Date of Establishment		Date of Shipment		Date of Expiry
	(f) Actual date of receipt of Consignment by the Laboratory/Institute				
	Date of Shipment		Date of Receipt at CSIR-NAL		
	(g) Scheduled date for completion of Installation, Commissioning and acceptance				
	(h) Actual date of completion of Installation, Commissioning and acceptance				
	(i) Penalty for Late Delivery (at Laboratory / Institute level) Rs.				
	(j) Penalty for Late Installation, Commissioning and Acceptance (at Laboratory / Institute level) Rs.				
2	Details of accessories/items not yet supplied and recoveries to be made on that account				
Sr. No.	Description			Amount to be recovered	
3	The acceptance test has been done to our entire satisfaction. The Supplier has fulfilled his contractual obligations satisfactory - Yes				
	OR				
	The Supplier has failed to fulfill his contractual obligations with regard to the following:				
Sr. No.	Description			Amount to be recovered	
The amount of recovery on account of failure of the supplier to meet his contractual obligations is as indicated at Para 3					
4	Liquidated Damages/Penalty Percentage		(a) If the Supplier fails to Supply, Install and Commission the system as per specifications mentioned in the order within the due date including training, the Supplier is liable to pay penalty of 0.5% of order value per week or part of a week.		
			(b) The maximum amount of penalty shall be 10%		
	No. of Days / Weeks delayed		Amount to be recovered		
5	Warranty Details				
6	Training, if any		COMPLETED/ NOT COMPLETED (attach training Certificate/document, if any)		
7	Details of Performance Security submitted in the form of Bank Guarantee / Demand Draft				
	BG No.	Date	Amount in Rs.	Valid till	% of BG
For Purchaser (Indenting Officer)			For Purchaser (Project Leader)		
Signature			Signature		
Name			Name		
Designation			Designation		
Name of the Laboratory/Institute		CSIR-NAL	Name of the Laboratory/Institute		CSIR-NAL
Date		130	Date		
For Supplier					
Signature					
Name					
Designation					
Name of the Supplier					
Date					

FORMAT OF INTEGRITY PACT
INTEGRITY PACT

Tender No.:

Between

Council of Scientific & Industrial Research (CSIR) a Society registered under the Indian Societies Act 1860 represented by _____ hereinafter referred to as “The Principal”.

Andherein referred to as “The Bidder/ Contractor.”

Preamble

The Principal intends to award, under laid down organizational procedures, contract/s forThe Principal values full compliance with all relevant laws of the land, rules, regulations, economic use of resources and of fairness/ transparency in its relations with its Bidder(s) and/or Contractor(s).

In order to achieve these goals, the Principal will appoint an Independent External Monitor (IEM), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1 – Commitments of the Principal

- (1) The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:
 - (a) No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
 - (b) The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
 - (c) The Principal will exclude from the process all known prejudiced persons.
- (2) If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the IPC/PC Act, or if there be a substantive suspicion in this regard, the Principal will inform the Chief Vigilance Officer and in addition can initiate disciplinary action.

Section 2 – Commitments of the Bidder(s)/Contractor(s)

- (1) The Bidder(s)/Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.
 - (a) The Bidder(s)/Contractor(s) will not, directly or through any other Person or firm, offer, promise or give to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
 - (b) The Bidder(s)/Contractor(s) will not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, Certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

- (c) The Bidder(s)/Contractor(s) will not commit any offence under the relevant IPC/PC Act; further the Bidder(s)/Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
- (d) The Bidder(s)/Contractor(s) of foreign origin shall disclose the name and address of the Agents/representatives in India, if any. Similarly the Bidder(s)/Contractors(s) of Indian Nationality shall furnish the name and address of the foreign principals, if any. Further details as mentioned in the “Guidelines on Indian Agents of Foreign Suppliers” shall be disclosed by the Bidder(s)/Contractor(s). Further, as mentioned in the Guidelines all the payments made to the Indian agent/representative have to be in Indian Rupees only. Copy of the “Guidelines on Indian Agents of Foreign Suppliers” is annexed and marked as Annexure.
- (e) The Bidder(s)/Contractor(s) will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
- (2) The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.
- (3) The person signing IP shall not approach the courts while representing the matters to IEMs and he/she will await their decision in the matter.

Section 3 – Disqualification from tender process and exclusion from future Contracts

- (1) If the Bidder(s)/Contractor(s), before award or during execution has committed a transgression through a violation of Section 2, above or in any other form such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/Contractor(s) from the tender process or take action as per the procedure mentioned in the “Guidelines on Banning of business dealings”. Copy of the “Guidelines on Banning of business dealings” is annexed and marked as Annex -“B”.

Section 4 – Compensation for Damages

- (1) If the Principal has disqualified the Bidder(s) from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.
- (2) If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to Section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages of the contract value or the amount equivalent to Performance Bank Guarantee.

Section 5 – Previous transgression

- (1) The Bidder declares that no previous transgressions occurred in the last 3 Years with any other Company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.
- (2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or action can be taken as per the procedure mentioned in “Guidelines on Banning of business dealings.”

Section 6 – Equal treatment of all Bidders / Contractors/ Sub-contractors

- (1) The Bidder(s)/Contractor(s) undertake(s) to demand from all Subcontractors a commitment in conformity with this Integrity Pact, and to submit it to the Principal before contract signing.
- (2) The Principal will enter into agreements with identical conditions as this one with all Bidders, Contractors and Subcontractors.
- (3) The Principal will disqualify from the tender process all bidders who do not sign this Pact or violate its provisions.

Section 7 – Criminal charges against violating Bidders / Contractors/ Subcontractors

- (1) If the Principal obtains knowledge of conduct of a bidder, Contractor or Subcontractor or of an employee or a representative or an associate of a bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the same to the Chief Vigilance Officer.

Section 8 - Independent External Monitors

- (1) The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.
- (2) The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the JS (A), CSIR.
- (3) The Bidder(s)/Contractor(s) accepts that the Monitor has the right to access without restriction to all Project documentation of the Principal including that provided by the Contractor. The Contractor will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors. The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s) / Subcontractor(s) with confidentiality.
- (4) The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.
- (5) As soon as the Monitor notice, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or to take other relevant action. The monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.
- (6) The Monitor will submit a written report to the JS(A), CSIR within 8 to 10 weeks from the date of reference or intimation to him by the Principal and should the occasion arise, submit proposals for correcting problematic situations.
- (7) Monitor shall be entitled to compensation on the same terms as being extended to/provided to Independent Directors on the CSIR.
- (8) If the Monitor has reported to the JS(A), CSIR, a substantiated suspicion of an offence under relevant IPC/PC Act, and the JS(A), CSIR has not, within the reasonable time taken visible action to proceed against such offence or reported it to the Chief Vigilance Officer, the Monitor may also transmit this information directly to the Central Vigilance Commissioner.
- (9) The word 'Monitor' would include both singular and plural.

Section 9 – Pact Duration

This Pact begins when both parties have legally signed it. It expires for the Contractor 10 months after the last payment under the contract, and for all other Bidders 6 months after the contract has been awarded.

If any claim is made/lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/determined by JS(A), CSIR.

Section 10 – Other provisions

- (1) This agreement is subject to Indian Law. Place of performance and Jurisdiction is the Registered Office of the Principal, i.e. New Delhi
- (2) Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.
- (3) If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.
- (4) Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

(For & On behalf of the Principal)
(Office Seal)

(For & On behalf of Bidder/Contractor)
(Office Seal)

Place.....

Place.....

Date.....

Date.....

Witness 1:(Name & Address): _____

Witness 2:(Name & Address): _____

TERMS & CONDITIONS

Tender No.	NAL/PUR/	
Sr. No.	Approximate weight of the Consignment	Approximate dimensions of the consignment
1		
2	Indian Customs Tariff No. and HSN No. (ICT & HSN No.)	
3	Country of Origin	
4	Percentage of Local Content	
5	Annual Turnover	
6	Type of Supplier	
7	Mode of Shipment By Air / SEA / Road / e-download	
8	Port of Destination	Final Destination
9	Delivery Term (INCO Term)	
10	Delivery Schedule including Supply, Installation, Commissioning, Training & Acceptance	
a)	Delivery of the Item as per Chapter-4/BoQ [In weeks / Days / Months] from the date of PO / LC / ILC / Advance [Mention the appropriate term]	
b)	Installation & Commissioning from the date of Delivery of item [In weeks/Days/Months]	
c)	Training from the date of Installation & Commissioning of item [In weeks/Days/Months]	
d)	Acceptance from the date of Training [In weeks/Days/Months]	
11	Installation & Commissioning (if any) Quoted Price inclusive or exclusive	
12	Training (if any) Quoted Price inclusive or exclusive	

13	Payment Term	
14	Currency of Bid/Quotation	
15	Statutory Levies [GST/IGST or any other taxes, duties] % of tax to be mentioned.	
16	Bidder GST No.	
17	Bidder Bank Details along with Cancelled cheque	
18	Insurance Coverage as per GCC/SCC Clause No.2.17.1	
19	Warranty	
20	Agree to submit Performance Security as per GCC/SCC Clause No.2.13.1	
21	Integrity Pact as per GCC/SCC Clause No.2.43.1 to be signed and stamped on Organization's Letterhead, if applicable	
22	Validity of offer as per Tender document	
23	Order to be placed [Full address, Tel #, Fax #, Email Id, Contact Person]	
24	Any other	
25	Total Price quoted as per BoQ/Price Schedule/List of Deliverables exclusive of tax	
26	Total Price quoted as per BoQ/Price Schedule/List of Deliverables inclusive of tax	
Note:	Unit Price indicating currency FOB (named port of shipment or FCA (named place of delivery))	

If country of Origin is Foreign, Bidders may provide the following details, as per GOI Procurement Policies (DIPP Order No.P-45021/2/2017-PP (BE-II)).

“Self-Certification that the item offered meets the minimum local content (in terms of percentage) giving details of the location(s) at which the local value addition is made in case the bidder wishes to avail the benefits under the Make in India Policy, if applicable”.

Confidentiality and Non-Disclosure Agreement

This Confidentiality and Non-Disclosure Agreement ("Agreement") is made and entered into on this ____day of..... 2021 ("Effective Date") by and between..... a company incorporated under the provisions of the Companies Act, 1956, having its Business Office at..... ("XYZ"), and **Council of Scientific and Industrial Research**, a society registered under the societies Registration Act XXI of 1860, having its Registered Office at Anusandhan Bhavan, 2 Rafi Marg, New Delhi 110001, represented by its **National Aerospace Laboratories**, located at P.B.No. 1779, HAL Airport Road, Kodihalli, Bangalore 560017, India ("**CSIR-NAL**"). Hereinafter either of the **Parties** is individually referred to as a "**Party**" and collectively as the "**Parties**" in this Agreement.

1. Disclosure of Confidential Information

For the purpose of this agreement, "**CSIR-NAL**" is "**Disclosing Party**" and "**XYZ**" is "**Receiving party**". Under this agreement, CSIR-NAL may disclose confidential information to the **Receiving Party** either orally or in any recorded medium, **during discussions and pre-bid meetings for providing** information comprising or relating to : techniques, schematics, designs, contracts, financial information, sales and marketing plans, business plans, clients, client data, business affairs, operations, strategies, inventions, methodologies, technologies, employees, subcontractors, pricing, service proposals, methods of operations, procedures, products and/or services ("Confidential Information") related to **SARAS Mk-II Aircraft programme. Based on the disclosure, Receiving Party will submit the tender for the RFQ generated from CSIR-NAL ("Purpose")**. Confidential Information shall include all nonpublic information furnished, disclosed or transmitted regardless of form.

2. Confidentiality

It is agreed that:

Receiving Party will use the Confidential Information solely for above stated purpose of this agreement. Receiving Party shall not copy, reproduce or use the Confidential Information in any way that is directly or indirectly detrimental to Disclosing Party or its subsidiaries or affiliates, and shall not disclose the Confidential Information to any unauthorized third party without written authorization by the Disclosing Party. Receiving Party shall ensure that access to Confidential Information is granted only to those of its employees or agents ("Representatives") who have a demonstrated need to know such information in order to carry out the business purpose of this Agreement. Prior to disclosing any Confidential Information to such Representatives, Receiving Party shall inform them of the confidential nature of the information and their obligation to refrain from disclosure of the Confidential Information. Receiving Party and its Representatives will take all reasonable measures to maintain the confidentiality of the Confidential Information, but in no event less than the measures it uses for its own information of similar type. Receiving Party and its Representatives shall not disclose to any person including, without limitation, any corporation, sovereign, partnership, limited liability company, entity or individual (i) the fact that any investigations, discussions or negotiations are taking place concerning the actual or potential business relationship between the parties, (ii) that it has requested or received Confidential Information, or (iii) any of the terms, conditions or any other fact about the actual or potential business relationship. Receiving Party and its Representatives will immediately notify Disclosing Party of any use or disclosure of the Confidential Information that is not authorized by this Agreement. Receiving Party and its Representatives will use its best efforts to assist Disclosing Party in remedying any such unauthorized use or disclosure of the Confidential Information.

The parties have appointed the following individuals to coordinate the disclosure and receipt of Confidential Information under this Agreement:

For XYZ Name: Title: Address: Telephone: E-mail: Fax:	For CSIR-NAL Name: Designation: Address: CSIR-National Aerospace Laboratories, HAL Airport Road, Kodihalli, Bengaluru – 560 017, Phone;;Fax:080- E-mail:
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Either Party may change above designated technical point of contact by informing other Party. Any Notices will be in writing and sent to each party at its address below which may be changed upon written notice. Notices will be effective upon receipt.

For XYZ Name: Title: Address: Telephone: E-mail: Fax:	For CSIR-NAL Name: Dr. M Manjuprasad Title: Head, KTMD Address: CSIR-NAL, P.B.No. 1779, HAL Airport Road, Kodihalli, Bangalore 560017 Telephone:080-25086207 E-mail: manjuprasad@nal.res.in Fax:080-25086147
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The obligations contained in this Section 2 will not apply to the extent that Receiving Party can demonstrate that the Confidential Information: (a) was part of the public domain at the time of disclosure or properly became part of the public domain, by publication or otherwise; (b) was rightfully acquired by Receiving Party from third Party prior to disclosure by Disclosing Party; (c) was independently developed by Receiving Party or its Representatives without reference to the Confidential Information; or (d) is in the possession of Receiving Party at the time of disclosure that may be demonstrated by business records of Receiving Party (e) is required to be disclosed by a government agency or by a proper court of competent jurisdiction; provided, however, that Receiving Party and its Representatives shall provide Disclosing Party prompt prior written notice of such requirement, shall consult with and assist Disclosing Party in obtaining a protective order prior to such disclosure, and shall only disclose the portion of Confidential Information which it has been advised by written opinion of counsel is legally required to be disclosed and shall use its best efforts to obtain assurance that confidential treatment will be accorded such information if the protective order is not obtained or if Disclosing Party waives disclosure of such information.

3. Ownership of Confidential Information

Disclosing Party retains all rights, title and interest to its Confidential Information. No license under any trademark, patent or copyright, or application for same which are now or hereafter may be obtained by Disclosing Party is either granted or implied by the disclosure of Confidential Information to Receiving Party. Confidential Information is provided “as is” basis. In no event shall Disclosing Party be liable for the accuracy or completeness of the Confidential Information.

4. Term

Unless renewed for a further period, this Agreement shall terminate **Five (05) years** from the Effective Date. For the term of this Agreement and **Ten(10) years** thereafter, the receiving party shall neither disclose the Disclosing Party’s confidential information to any other third party.

5. Return of Confidential Information

During the term of this agreement, upon written request of Disclosing Party, Receiving Party and its Representatives shall promptly return to Disclosing Party all copies of Confidential Information in its possession including, without limitation, all copies of any analyses, compilations, studies or other documents prepared by Receiving Party or its Representatives containing or reflecting any Confidential Information. Receiving party shall certify in writing that it and its Representatives have returned all such information to Disclosing Party.

6. General

- a) This Agreement and all questions relating to its validity, interpretation, performance and enforcement (including, without limitation, provisions concerning limitations of actions), shall be governed by and construed in accordance with the laws of India and is subject to the exclusive jurisdiction of the Courts of Bangalore, India and may be modified only in writing and signed as accepted by both the Parties.
- b) Receiving Party agrees that the breach of the provisions of this Agreement by it, will cause Disclosing Party irreparable damage for which recovery of money damages would be inadequate. Disclosing Party will, therefore, be entitled to obtain timely injunctive relief to protect its rights under this Agreement in addition to any and all remedies available at law or in equity. Any Dispute or claim arising out of or relating to this Agreement shall be first tried to solve through mutual discussions by authorized representatives of both the Parties. If no conclusion is arrived at through such mutual discussions within a period of 30 days, then the dispute should be settled by arbitration in accordance with Delhi International Arbitration Center (DIAC), Delhi High Court, New Delhi. Decision of arbitral tribunal shall be final and binding on the Parties. Parties shall equally bear the cost of arbitration and its proceedings unless the award provides otherwise. The Parties shall continue to perform their respective obligations under this Agreement during the pendency of the arbitration proceedings except insofar as such obligations are the subject matter of the said arbitration proceedings.
- c) Neither party may assign any of its rights or obligations under this Agreement without the prior written consent of the other party. This Agreement shall be binding upon and inure to the benefit of the parties permitted successors and assigns.
- d) This Agreement may be amended or supplemented only by a writing that is signed by duly authorized representatives of both parties.
- e) No term or provision hereof will be considered waived by either party, and no breach excused by it, unless such waiver or consent is in writing signed an authorized representative of the non-breaching party. No consent to, or waiver of, a breach by a party, whether express or implied, will constitute a consent to, waiver of, or excuse of any other, different, or subsequent breach.
- f) Either party may terminate this Agreement upon service of 60 days' prior written notice to the said effect on the other party with return of confidential information as stated in Clause 5.
- g) If any part of this Agreement is found invalid or unenforceable, that part will be amended to achieve as nearly as possible the same economic and legal effect as the original provision and the remainder of this Agreement will remain in full force.

- h) This Agreement constitutes the entire agreement between the parties relating to this subject matter and supersedes all prior or simultaneous representations, discussions, negotiations, and agreements, whether written or oral.

In witness whereof, the parties hereto have Accepted and agreed this agreement as of the date first above written by the following authorized Party representatives:

FOR AND ON BEHALF OF XYZ	FOR AND ON BEHALF OF CSIR-NAL
Signature: Name: Designation & Seal:	Signature: Name: Dr. M Manjuprasad Designation & Seal: Head, KTMD
Witnesses (Name & Signature): 1. 2.	Witnesses (Name & Signature): 1. 2.