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Jan 17

**REQUEST FOR INFORMATION (RFI) FOR PROCUREMENT OF MULTI-
ROLE CARRIER BORNE FIGHTER FOR THE INDIAN NAVY**

1. The Ministry of Defence, Government of India, intends to procure approximately 57 Multi-Role Carrier Borne Fighters (MRCBF) for aircraft carriers of the Indian Navy (**IN**).

2. This Request for Information (RFI) consists of two parts as indicated below: -

(a) **Part I.** This part of the RFI incorporates operational characteristics and features that should be met by the aircraft. Few important technical parameters of the proposed aircraft are also mentioned.

(b) **Part II.** This part of the RFI states the methodology of seeking response of the vendors. Submission of incomplete response format will render the vendor liable for rejection.

PART - I

3. **Intended Use.** The MRCBF are intended as day and night capable, all weather multi-role deck based combat aircraft which can be used for Air Defence (AD), Air to Surface Operations, Buddy Refuelling, Reconnaissance, EW missions etc from **IN** aircraft carriers.

4. **Important Parameters.**

(a) Technical parameters for the MRCBF as per **Appendix A.**

(b) What would be the approximate budgetary estimates for the MRCBF you would be supplying including customs duties, spares, installation, commissioning, training, documentation, Comprehensive Annual Maintenance for the life cycle of the aircraft (post warranty) and

depot level repair facility? This information is to be provided mandatorily under separate heads.

(c) What level of ToT and deep repair expertise is the company willing to share with India? The vendor should specify Critical Technologies required and comment on its ability to absorb the aircraft manufacturing technology at the levels of sub vendor/ supply chain elements in India through ToT from OEM and its partners. The details and guidelines on ToT aspects are as given in DPP 2016, the same may also be commented upon comprehensively in terms of their range and depth for the aircraft, simulators, weapons and supporting equipment and products being offered.

(d) The vendors are required to indicate whether the aircraft has been supplied by them to the country of origin or any other country.

(e) Feasibility/ Willingness to conduct FET in India. Field Evaluation Trials (FET) which cannot be undertaken in India to be indicated with reasons.

(f) What is the manpower required for O and I level maintenance of one aircraft?

(g) **Option Clause.** An Option Clause may be exercised in the procurement case. Vendors must express their willingness or otherwise for Option Clause, including the duration for which the Option clause would be valid.

(h) Would the vendor comply with all provisions of DPP 2016? If not, which Para/ Clause of DPP would not be agreed to with reasons?

(j) Willingness to offer offsets to be indicated by vendors.

(k) Vendors may consider RFI as advance information to obtain requisite government clearance. What kind of Governmental and Commercial clearances/ licenses will be required both by the vendor and the OEM in case of products including GSE, GHE, testers & tools and its product support?

(l) **Time Frame.** The deliveries of the aircraft would need to commence within three years post conclusion of contract, and be completed within further period of three years.

(m) The vendors are required to indicate their willingness to the terms of payment as per DPP-2016.

(n) Any other relevant information on capability of performing the roles, additional roles possible and maintenance philosophy may also be specified.

(p) What kind of interaction (direct or through aircraft manufacturer), for maintenance and repair is envisaged with vendors/sub vendors/supply chain components post induction of aircraft in order to support the product? Concept envisaged therein, be also described in detail.

(q) Does the company have any strategic partnership with any government/ private aircraft manufacturer/ designer?

(r) Is the company willing to setup production centres in India as part of offset obligations?

(s) **Indigenisation Content.** Level of indigenisation in content and design, in percentage, is to be clearly indicated for all components of the core and associated equipment that is being quoted by the Vendors. The acquisition category will be based on this information, as detailed in DPP-2016.

(t) Vendors would also be required to provide training to the Buyer in operations and maintenance of the aircraft.

5. Vendors should confirm that following conditions are acceptable:-

(a) The solicitation of offers will be as per “Single Stage-Two Bid System”. It would imply that a “Request for Proposal” would be issued soliciting the technical and commercial offers together, but in two separate sealed envelopes. The validity of commercial offers would be at least 18 months from the date of submitting of offers.

(b) The technical offers would be evaluated by a Technical Evaluation Committee (TEC) to check its compliance with RFP.

(c) The equipment of all TEC cleared vendors would be put through a trial evaluation in India on a “No Cost No Commitment” basis. A staff evaluation would be carried out by SHQ to analyse the result of field evaluation and shortlist the aircraft for introduction into service.

(d) Amongst the vendors cleared by GS evaluation, a Contract Negotiations Committee would decide the lowest cost bidder (L1) and conclude the appropriate contract.

(e) Vendor would be bound to provide product support for time period specified in the RFP, which includes spares and maintenance tools/jigs/fixtures for field and component level repairs.

- (f) The vendor would be required to accept the general conditions of contract given in the Standard Contract Document at Chapter VI of DPP-2016 placed on www.mod.nic.in.
- (g) **Offset.** The vendor has to undertake offset contracts amounting to 30 % of the value of commercial proposals (Refer Appendix D to Chapter II of DPP-2016).
- (h) **Integrity Pact.** An integrity pact along with appropriate IPBG is a mandatory requirement in the instant case (Refer Annexure I to Appendix M of Schedule I of DPP-2016).
- (j) **Performance-cum-Warranty Bond.** Performance-cum-Warranty Bond of 5% of value of the contract is required to be submitted after signing of contract.
- (k) **ToT.** GoI is desirous of license production of the aircraft after acquiring ToT in the case.

PART – II

6. Procedure for Response.

- (a) Vendors must fill the form of response as given in **Appendix B**. Apart from filling details about company, details about the exact product meeting our generic technical specifications, should also be carefully filled. Additional literature on the product can also be attached with the form.
- (b) The response to the RFI should be clearly labelled as **RFI RESPONSE – MRCBF** and dispatched at the under mentioned address:-

The Principal Director of Naval Air Staff
Integrated Headquarters of Ministry of Defence (Navy)
Directorate of Naval Air Staff (DNAS)
A - Block Hutments
Dalhousie Road
New Delhi 110011
Fax: +91 11 23010351
Email ID: dnas@navy.gov.in

- (c) Last date of acceptance of filled form is four months from the date of issue of RFI. The vendors short listed for issue of RFP would be intimated.

7. The Government of India invites responses to this request only from Original Equipment Manufacturers (OEM)/ Authorised Vendors/ Government Sponsored Export Agencies (applicable in the case of countries where domestic laws do not permit direct export by OEMs). The end user of the equipment is Indian Navy.

8. This information is being issued with no financial commitment and the Ministry of Defence reserves the right to change or vary any part thereof at any stage. The Government of India also reserves the right to withdraw it should it be so necessary at any stage. The acquisition process would be carried out under the provisions of DPP 2016, as amended from time to time.

Appendix A
(Refers to Para 4)

**BROAD IMPORTANT TECHNICAL, OPERATIONAL
AND GENERAL PARAMETERS FOR WHICH INFORMATION IS REQUIRED**

1. The parameters/ specifications mentioned in succeeding paragraphs are requested in the response to our Request for Information.

2. **Indian Reference Atmosphere.** Performance requirements unless stated otherwise must be met in Indian Reference Atmosphere (IRA) conditions. The relevant parameters of IRA are as under:-

(a) Sea level Mean Temperature (°C) : International Standard Atmosphere (ISA)+15 °C

(b) Reference temperature for take-off and landing ashore: ISA+20°C

(c) Lapse Rate from Sea Level upto 16 km : 6.5 °C/Km

(d) Temperature at 16 km (°C) : -74

(e) Lapse Rate from 16 km to 20 km : 2.5 °C/Km

(f) Mean Sea Level Pressure : 1005 mb

3. **Configurations.** Operational Clean Configuration (OCC) implies carriage of four Beyond Visual Range (BVR) missiles and two All Aspect Air-to-Air Missiles (A₄M) with 75 % internal fuel and 100 % gun ammunition. Clean Configuration implies the aircraft with no external load and full internal fuel and gun ammunition.

4. **Speeds.** All speeds are Equivalent Air Speed (EAS), unless otherwise stated.

5. Additional information on the ships that the MRCBF is expected to operate, may be sought from IHQ MoD (N)/ DNAS for response and establishing feasibility of operating the aircraft from the same.

General and Technical Parameters and Associated Equipment

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
<u>Section I - General Information</u>		
1.	Physical Parameters and Features	<p>(a) What is the category and type of the aircraft in terms of weight and roles of aircraft?</p> <p>(b) What are the external dimensions of the aircraft, height, span (both wing folded and spread), wheel track, wheel base, overall length (without and with Nose Fold) etc.? Vendor is requested to provide 3D model of the aircraft in clean and all cleared configurations in AutoCad format.</p> <p>(c) What are variants available for the aircraft (single/ twin seat) and their role capability?</p> <p>(d) Does the twin seat variant retain all operational attributes of the single seat variant {radar, Air to Air Refuelling (AAR) probe} etc?</p> <p>(e) In case of twin seat aircraft, is the workload manageable by a single pilot and is it possible to undertake single seat operation in all roles?</p> <p>(f) Does the aircraft have capability to operate from both STOBAR (Short Take-off But Arrested Recovery) and CATOBAR (Catapult Take-off But Arrested Recovery) aircraft carriers without any modification to the aircraft?</p> <p>(g) If the aircraft is primarily designed for CATOBAR carriers, specify in detail operational limitations and restrictions for the aircraft when operated from a STOBAR carrier, in particular reduction in launch mass performance under various conditions {combinations of Wind on Deck (WOD), ambient temperature, ship motion etc}.</p>
2.	Maturity and availability date	(a) Is the aircraft (in present configuration) being offered operational with the country of origin and/or any other country? If so, for how long and how many numbers? And if not, why?

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		(b) What is the design/ production maturity of the aircraft to allow commencement of delivery?
3.	Conditions of use (environmental conditions)	<p>(a) Is the aircraft and its systems tropicalised and marinised? Vendor to provide the cleared operating temperature range, relative humidity and other relevant environmental conditions.</p> <p>(b) Are the associated Test Tools and equipment tropicalised and ruggedized? Vendor to provide the cleared operating temperature range and relative humidity.</p> <p>(c) Is the aircraft adequately protected against effects of lightning strike as per MIL or equivalent standards?</p> <p>(d) Are the flight safety related systems hardened against Electro-Magnetic Pulse (EMP)?</p> <p>(e) Are the aircraft and the pilot adequately protected whilst operating in Nuclear Biological and Chemical (NBC) environment? If so, details thereof.</p>
<u>Section II - Conditions of Use</u>		
4.	Sea State/ ship motion parameters	What are roll, pitch and heave operating limits of aircraft whilst operating from STOBAR and CATOBAR aircraft carriers?
5.	Conditions of use (Ashore operations)	<p>(a) Provide values for the following parameters:-</p> <p>(i) Certified max Take-off Weight.</p> <p>(ii) Certified Max Landing Weight.</p> <p>(iii) Operational Empty Mass (with details of the items included/excluded).</p> <p>(b) At max take-off All Up Weight (AUW), what is the PCN requirement of the aircraft from runways?</p> <p>(c) Upto what airfield elevation {in ft above Mean Sea Level (AMSL)} and minimum length (in ft) is the aircraft capable of operating at maximum</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>AUW in nil wind conditions?</p> <p>(d) What is the take-off ground roll (to unstick) at sea level?</p> <p>(e) What is the landing roll (with and without auxiliary braking devices) of the aircraft in OCC and max landing weight configuration at sea level? Also the Calibrated Air Speed (CAS) for the same to be provided.</p>
6.	Conditions of use (Carrier operations)	<p>(a) At max certified Landing Weight, what is the deck strength required?</p> <p>(b) Take-off and landing performance as per Section V of this document.</p>
<u>Section III – Portability</u>		
7.	Slinging	<p>(a) Is the aircraft capable of being under slung from the crash and salvage crane onboard the aircraft carriers and ashore? Will the vendor provide slings? If yes, what is the lifting load capacity of the slings?</p> <p>(b) Vendor to provide required specifications of the salvage crane?</p>
8.	Deck Manoeuvring	<p>(a) Is the aircraft capable of being manoeuvred on flight deck and hangar of the IN aircraft carriers? If yes, what are technical specifications of the towing equipment for the same and will the same be provided with the aircraft?</p> <p>(b) What is the nose wheel castoring and radius of turning of the aircraft in case of taxing under power and or being towed?</p>
<u>Section IV - Physical and General Characteristics</u>		
9.	General Characteristics	<p>(a) What duration is the aircraft capable of sustaining 'g' < 0 with afterburner engaged?</p> <p>(b) Do all mission and safety critical systems have adequate redundancy and are they adequately separated and protected?</p> <p>(c) Is the aircraft capable of carrying passive</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>Electronic Counter Measure (ECM) equipment as well as self-protection jammers?</p> <p>(d) What is the Radar Cross section (RCS) of the aircraft in the Land strike/ CAP/ Anti-shipping/ ML escort/ Buddy Refuelling configurations for the relevant radar frequency bands?</p> <p>(e) What is the static Thrust-to-Weight (TWR) ratio of the aircraft at sea level, in ISA conditions and in the Operational Clean Configuration (with 50% and 75 % internal fuel) with maximum afterburner? Assume un-installed average engine maximum rated thrust of the engine.</p> <p>(f) What is the static TWR ratio of the aircraft at sea level, in ISA conditions and in the strike configuration at Max All-Up Weight? Assume un-installed average engine maximum rated thrust of the engine.</p> <p>(g) What is the maximum flying duration of the aircraft with and without AAR?</p> <p>(h) What are respective operational turn round timings inclusive of rearming, refuelling and replenishment in cleared Land strike/ CAP/ Anti-shipping/ ML escort/ Buddy Refuelling configurations with one team, of not more than five technicians per aircraft, with any combination of weapon / reconnaissance load?</p> <p>(j) Can the aircraft wings be folded? If so, does the aircraft have to be powered up for wing folding and extension? Can it be done using alternative means?</p>
10.	Power Plant and Intake	<p>(a) How many engines does the aircraft have?</p> <p>(b) What is the type and rated (un-installed) sea level, static Max Dry and Max Reheat thrust of engine/s fitted on aircraft?</p> <p>(c) What is the time taken to achieve full power for take-off from ashore and deck?</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>(d) Does the engine have Full Authority Digital Engine Control (FADEC) mechanism with auto throttle capability?</p> <p>(e) What is the redundancy for FADEC mechanism?</p> <p>(f) Is the starter system self-contained and how many consecutive starts can it provide without cooling requirements?</p> <p>(g) Does the engine have life monitoring mechanism such as Health Usage and Monitoring System (HUMS) which is connectible to ground station?</p> <p>(h) What is the mode for data retrieval?</p> <p>(j) Does the air-intake/ engine combination permit surge free engine operation throughout the flight envelope of the aircraft, especially during operations from STOBAR and CATOBAR carrier such as bolters or go-around? Are there any engine slam restrictions for bolters or other regimes? If yes, details thereof to be provided. Describe all air intake features.</p> <p>(k) What are the measures to prevent Foreign Object Damage (FOD) built into the design of the intake and engine?</p> <p>(l) Is the engine/intake design capable of withstanding impact of a bird at the maximum low level speed as specified in the relevant US Military specifications or equivalent standards? Quantify bird mass and CAS/ Mach no.</p> <p>(m) Is the engine(s) exhaust smoke free at all power settings within the flight envelope?</p> <p>(n) Is the engine capable of air start (relight in air) and up to what altitude or any other limitations for relight? Describe in-flight engine start modes like auto-relight, spool-down relight, windmill relight and assisted start relight capabilities with envelope limitations.</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>(p) Is there any requirement of warming the engine(s) in terms of time and RPM under various temperature conditions at sea or ashore prior to launch from CATAPULT or Ski-Jump? If yes, vendor to provide temperature, pressure and velocity graphs of jet efflux at idle, 80% RPM (or warmup RPM), maximum dry and Reheat settings and fuel consumption.</p> <p>(q) Is the aircraft capable of scrambling with minimum warmup? Will there be an impact on engine performance or engine life?</p> <p>(r) Is engine removal and installation feasible onboard aircraft carrier in short time with minimum manpower and Ground Support Equipment (GSE)? If yes, the details to be provided.</p> <p>(s) Is a test flight required post engine change (single or both) or is ground running/ cold checks are sufficient?</p> <p>(t) Are any thrust check algorithms available to validate Max Reheat thrust in the cockpit before carrier launch?</p> <p>(u) What is the qualified life of the hot end and cold end parts of the engine (in terms of Flight/Mission hours)? What is the percentage share of shore and carrier take-offs (CATOBAR and STOBAR) assumed for estimating engine life?</p> <p>(v) What is loss in thrust expected at end of hot end life and its impact on launch performance?</p>
11.	Fuel System	<p>(a) Are the internal fuel tanks of the aircraft self-sealing?</p> <p>(b) Is it possible to refuel from a single pressure refuelling point?</p> <p>(c) What are the specifications of the fuelling coupling/ adapter?</p> <p>(d) Is there a provision of partial refuelling and hot refuelling on the aircraft?</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>(e) Is the aircraft capable of using ATF-K50 as well as JP-5 aircraft fuel? Are there any limitations on mixing these two fuels?</p> <p>(f) Is it possible to de-fuel the aircraft from a single point without the need for extra ground support equipment?</p> <p>(g) Is there a provision to transfer fuel from one side to another?</p> <p>(h) Is the fuel system of the aircraft capable of gauging entire fuel capacity and indicate the usable fuel on cockpit gauge at all times?</p> <p>(j) What are the measures incorporated in the fuel system for adequate redundancy and protective features to enhance survivability?</p> <p>(k) Does the aircraft have day and night Air-to-Air Refuelling capability and is it capable of replenishing all its internal and external tanks.</p> <p>(l) What is the maximum Air to Air Refuelling rate at 50 % of the internal fuel capacity?</p> <p>(m) Does the aircraft have facility for rapid jettisoning of fuel to facilitate immediate landing after launch from the aircraft carrier? What is the auto cut-off value of fuel jettison, if any? If yes, what is the endurance of the aircraft with the remaining fuel?</p> <p>(n) Are there any limitations on jettisoning of fuel in dry and afterburner regime of the engine/s?</p> <p>(p) Is the aircraft integrated with a NATO standard buddy refuelling pod and what is the minimum refuelling rate?</p> <p>(q) What are the types of external removable fuel tanks with capacity speed & g limits etc?</p> <p>(r) What is the maximum Internal Fuel capacity (litres & kg)?</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		(s) Is it feasible to access fuel tanks for repairs at O and I level repairs?
12.	Hydraulics	<p>(a) What is the type and number of hydraulic systems with redundancies {such as Ram Air Turbine (RAT etc)}, to operate essential services?</p> <p>(b) Does any single failure result in a situation where an essential system cannot be operated either by the main or the standby/ emergency system?</p> <p>(c) Are the hydraulic lines shielded by the airframe protective structures?</p> <p>(d) What is the specification of hydraulic fluid used and operating pressure of the system? Also, the specification of the coupling/ adapter to be indicated?</p>
13.	Flights Controls	<p>(a) What is the Flight Control system available and level of redundancy?</p> <p>(b) In case of failure, is reversion to standby system/ manual mode possible?</p> <p>(c) What is the duration upto which electronics of the flight control system are able to perform without cooling air in case of failure of the Environmental Control System (ECS)?</p> <p>(d) Are the pipelines for the duplicated flying controls adequately separated and protected to ensure safety?</p> <p>(e) Are Flight Control checks possible with wings folded?</p> <p>(f) Is there a separate mode for launch and recovery whilst operating from ashore and aircraft carrier?</p>
14.	Landing Gear	<p>(a) What is the type of landing gear in aircraft?</p> <p>(b) Is the landing gear capable of withstanding the loads of a Ski-Jump take-off and does the stress lead to bottoming of undercarriage in heaviest configuration of the aircraft at highest ramp entry speed?</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>(c) Is the Main Landing Gear capable of withstanding loads of holding on Restraining Gear System fitted on IN STOBAR aircraft carriers at maximum afterburner rating?</p> <p>(d) Is the Nose Landing Gear designed and capable of undertaking Catapult Launch from contemporary Steam and Electro Magnetic Aircraft Launch (EMAL) systems?</p> <p>(e) Are the landing gears and aircraft capable of arrested deck landing and withstanding longitudinal deceleration limit of -4.5 g with a safety factor?</p> <p>(f) What is the maximum rate of descent and 'g' that the undercarriage is capable of withstanding during landing on an aircraft carrier (including ship motion)?</p> <p>(g) Is there any separate life (in terms of number of landings ashore/ afloat wrt weight) of undercarriage other than the fatigue life of the airframe.</p> <p>(h) Is there adequate deck clearance for the carriage of all externally mounted equipment/ weapons from all pylons?</p> <p>(j) What is the main and standby mode of lowering the undercarriage?</p> <p>(k) What are the tyre pressures for shore and deck operations?</p> <p>(l) What are the maximum ground speed limits for main and nose tyres?</p>
15.	Brake System	<p>(a) How many brake systems are provided for redundancy?</p> <p>(b) What is the provision for normal braking with individual brakes and parking brakes in the cockpit?</p> <p>(c) What is the max power the aircraft is capable of holding on brakes ashore and deck</p>

Ser	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>(define surface friction co-efficient)?</p> <p>(d) What is the provision for emergency braking in the cockpit?</p> <p>(e) What are the types of Anti-skid devices fitted on the wheel brake system (nose and main)?</p> <p>(f) What is the maximum Take-off weight up to which (Rejected Take-off) RTO can be achieved from rotation speed with / without use of brake parachute, both at sea level and 11000 ft elevations, IRA? Assume dry level runway without use of any shore based arrestor gear.</p> <p>(g) Is there a provision to recharge the brake system for more brake applications without engine power?</p>
16.	Nose Wheel Steering	<p>(a) Is the Nose Wheel Steer (NWS) fitted capable of manoeuvring on deck, with or without its own power and able to be towed within confined space of flight deck and hangar?</p> <p>(b) What is capability of nose wheel for normal and powered castoring?</p> <p>(c) Does the NWS have self-centring device?</p> <p>(d) How is the NWS engaged for ashore and afloat operations?</p>
17.	Auxiliary Braking Device	<p>(a) Does the aircraft have an auxiliary braking device (such as brake chute)?</p> <p>(b) If an auxiliary braking device is not available, will it meet all landing/ deceleration performance requirements under IRA conditions without damage to or requirement of replacement of components of the braking system, including during emergency landing at maximum ashore landing weight and at high elevation airfields.</p> <p>(c) Is brake cooling a restrictive factor in achieving the desired turn-around times for the aircraft?</p>
18.	Arrestor Hook	<p>(a) What is the type of arrestor hook provided</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>to engage the arrester wires of Arresting Gear Systems onboard aircraft carriers and ashore?</p> <p>(b) Is installation of the arrester hook system in accordance with provisions of MIL-A-18717C or revisions or equivalent standards?</p> <p>(c) How many arrests is the arrester hook capable of undertaking prior inspection or change?</p> <p>(d) What are the redundancies provided for lowering the arrester hook?</p>
19.	Cockpit Layout and Ergonomics	What are the standards followed towards arriving at the cockpit layout of controls and displays for efficient operations?
20.	Man-Machine Interface	Would it be possible for the vendor to incorporate symbology and display pages as per IN specifications and finalise the Man Machine Interface mutually between the vendor and IN ?
21.	HOTAS Ergonomics	Does the aircraft cockpit have Hands On Throttle and Stick (HOTAS) ergonomics?
22.	Pilot Percentile	What is the Indian pilot percentile for cockpit entry and exit, operation of switches/control and safe ejection?
23.	Air-Conditioning	<p>(a) What is the maximum cockpit temperature and humidity controlled by aircraft's air conditioning system and could these conditions be achieved while flying at low-level and high speed under hot ambient conditions of ISA + 25°C?</p> <p>(b) Does the cabin air conditioning cater for pilot comfort during ground operation of the aircraft up to 20 min under ISA + 25°C temperature conditions?</p> <p>(c) Is there any redundancy for air conditioning system?</p> <p>(d) Do the avionics bays on the aircraft have adequate environmental control to ensure reliable operation of the systems for the required duration of continuous operation whilst on ground in ISA+ 25°C?</p>

Ser	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>(e) Does the aircraft's air conditioning system cater for cooling reserves for integration of additional equipment in future?</p> <p>(f) Is there a provision of de-pressuring the cockpit externally on ground in the event of system malfunction?</p>
24.	Cockpit Noise Level	For the cockpit noise level, which MIL or equivalent standard does the aircraft conform to?
25.	External Vision Requirements	<p>(a) Do the canopy, windshield and the surrounding structure provide good all round external vision from the cockpit (indicate field of view)?</p> <p>(b) Does the approach Angle of Attack (AOA) provide adequate 'Over the Nose' vision as per MIL standards for aircraft carrier approach and landing?</p> <p>(c) Is the canopy material resistant to 'crazing' and cracking?</p> <p>(d) Does the aircraft provide adequate clearance between the pilot's Helmet Mounted Sight and Display (HMSD/ Night Vision Goggle (NVG) and the canopy, during movement of pilot's head to either extreme?</p> <p>(e) Is the windscreen capable of withstanding impact of a bird hit and which relevant MIL or equivalent standards does it conform to? Quantify bird mass and CAS/ Mach no.</p> <p>(f) In twin-seater aircraft, is the external vision from the rear cockpit adequate for instructional purposes including combat and armament training/ demonstration from the rear cockpit? If no, what are the alternate methods to achieve the same?</p>
26.	Instrumentation	<p>(a) Does the aircraft have a glass cockpit concept and does it have Multi-Functional Display (MFD) or Large Area Display (LAD) concepts?</p> <p>(b) Are all flight and mission parameters displayed on the large Field of View Head Up Display (HUD) and MFDs?</p>

Ser	<u>Parameter/ Specification</u>	<u>Queries</u>
		(c) Is the cockpit lighting and instrumentation NVG compatible? If yes, then up to which Gen standards?
27.	Oxygen	<p>(a) What is the type and capacity (including duration under different conditions) of integral onboard oxygen generation and storage system?</p> <p>(b) What is the capacity and duration of emergency standby oxygen for a safe recovery?</p> <p>(c) What are the specifications of the coupling/ adapter for oxygen charging (if required) and pressure required for the same?</p>
28.	Crew Amenities	Is there a facility to allow the crew members to relieve themselves and take provisions in flight?
29.	Escape System (Ejection System)	<p>(a) What is the make and type of ejection seat fitted on the aircraft and does it ensure safe ejection under Zero-Zero conditions (zero height and zero speed)?</p> <p>(b) Define the operating envelope of the aircraft when the system ensures safe ejection?</p> <p>(c) Does the aircraft have command ejection system in twin-seater variant?</p>
30.	Escape System (Life preserver/ Parachute)	<p>(a) What is the make and type of Automatic Inflatable Life Jacket provided on the aircraft?</p> <p>(b) Vendor to provide integration details with seat and survival pack.</p> <p>(c) What is the make and type of main parachute provided on the aircraft? Also, what is the parachute separation mechanism in case of landing in water?</p>
31.	Escape System (Survival Pack)	<p>(a) Is the survival pack composite or does it incorporate interchangeable survival packs for maritime, desert, mountainous and tropical forests?</p> <p>(b) Does it form part of the aircrew escape system?</p> <p>(c) Does it have a provision to carry a Personal Rescue Beacon (PRB)/ Personal Locator Beacon (PLB) and would it be possible for vendor to</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>integrate PRB specified by the IN if agreed mutually?</p> <p>(d) Does the PRB offered by vendor have GPS and CSAR mode?</p>
32.	Electrical System	<p>(a) What are the type, capacity and number of power generating systems of aircraft?</p> <p>(b) What is the spare capacity of each of the power generating systems of the aircraft at maximum load?</p> <p>(c) Does the aircraft have adequate redundancy in both AC and DC systems to cater for uninterrupted mission accomplishment despite any single system failure?</p> <p>(d) Does the aircraft have an external receptacle to supply stabilized power to aircraft systems from a deck/ ground power source? What are the specifications of the external receptacle coupling/ adapter and type of supply required for the same?</p> <p>(e) What is the type, capacity and number of internal batteries on the aircraft?</p> <p>(f) How many internal starts of the engine/s or auxiliary power unit is the internal battery pack capable of giving when connected in parallel to the AC/ DC power system? Does the aircraft have provision for start with external power supply source?</p> <p>(g) What is the duration upto which the internal batteries are capable of giving emergency electric supply to essential systems, if the aircraft does not have second level power backup?</p> <p>(h) Can the electrical power system handle all loads after single engine failure (in case of twin engine aircraft)?</p>
33.	General Avionics	<p>(a) How is the data from all the avionics and sensors combined and presented for the pilot?</p> <p>(b) Does the aircraft have data fusion to</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		optimize mission accomplishment?
34.	Radio Communication	<p>(a) How many radio sets does the aircraft communication suite have?</p> <p>(b) What are the operating characteristics of R/T sets?</p> <p>(c) How many of the radio sets are Software Defined Radios (SDR) with VHF/ UHF trans-receivers? Does it have a facility to listen on both sets simultaneously?</p> <p>(d) What are the technical characteristics of the SDR?</p> <p>(e) How many R/T sets have a secure mode with (Electronic Counter Counter Measures) ECCM facility?</p> <p>(f) Does the aircraft have long range communication capability using HF and/ or Satcom facility?</p> <p>(g) Does the aircraft have a secure data link for real time sharing of information? What is the bandwidth and data transfer rate of the data link to support real time transfer of framed pictures/ videos?</p> <p>(h) Would it be possible to create codes of the secure mode specific to the IN and the ownership of these codes lie with the IN?</p> <p>(j) Would it be possible to integrate IN selected data link system into the aircraft?</p> <p>(k) Does the datalink have its own trans receiver independent of aircraft radio sets?</p> <p>(l) Is it possible to maintain any of the R/T sets as a standby for data link?</p>
35.	Navigation and Attack System	(a) <u>Inertial Ring Laser Gyro (RLG)/ Fibre Optic Gyro (FOG) with Embedded Satellite Navigation System (SNS).</u>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>(i) Is the aircraft fitted with RLG/ FOG based IN/ SNS system?</p> <p>(ii) Is the SNS GPS/ GLONASS / Galileo/ IRNSS/ Gagan compatible?</p> <p>(iii) What are the types and time for alignment ashore and onboard the aircraft carrier?</p> <p>(iv) Is there a feature for quick alignment onboard the ship and in-flight?</p> <p>(v) Can the aircraft's INS system initialise itself and if not, what kind of input would be required to achieve the same?</p> <p>(vi) If it needs inputs, would the vendor establish suitability of existing systems or propose an alternate (RF/ IR/ Wired) system?</p> <p>(vii) Is the INS capable of alignment with the ship manoeuvring? If yes what are the limitations of ship motion and manoeuvring?</p> <p>(viii) What are the INS navigation errors (in nm/ hr Circular Error Probability) in stand-alone mode (without SNS)?</p> <p>(b) Does the aircraft have an open architecture mission computer and avionics system with redundancy and an adequate capacity for integration of future weapons/sensors?</p> <p>(c) <u>Head Up Display (HUD).</u></p> <p>(i) What is the type of HUD on the Aircraft and type of scan?</p> <p>(ii) Does it have the capability to carry our Air Defence related radar work on HUD/ Head Level Display?</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>(iii) Is the HUD capable of displaying relevant symbology, including information from additional sensors, for the Ground Attack role etc?</p> <p>(iv) What is the redundancy for HUD failure?</p> <p>(d) <u>Infra Red Search and Track (IRST) and Laser Range Finder.</u> Is there a provision of an IRST on the aircraft and is it capable of carrying a laser range finder which could be used for both air-to-air and air-to-ground applications?</p> <p>(e) <u>Radio / Laser Altimeter and Ground Proximity Warning System.</u> Is the aircraft fitted with a radio or laser altimeter and GPWS? If yes, what is the range of the radio/ laser altimeter (in ft AGL)? Is there a provision of Variable Altitude Limiting Indicator (audio/ visual)?</p> <p>(f) Is there a provision of a Digital Map Generation facility on the aircraft? If yes, then would the vendor supply these maps? What is the format of these maps and can IN prepare its own maps and load when required?</p> <p>(g) <u>Airborne Multi-Mode Radar.</u> What is the type of multi-mode airborne radar on the aircraft? What are the technical specifications of the Multi-Mode Radar as per Annexure I?</p> <p>(h) <u>Navigational Aids.</u> Is the aircraft equipped with VOR, TACAN and ILS receivers?</p> <p>(j) <u>Recovery Aids.</u> Is there a provision of MLS and PAR receivers for auto approach/ landing on the aircraft? Can the aircraft use the existing Rezistor-E system fitted on the aircraft carrier or would it need a different/ additional system? If it needs additional system, indicate type and make of the system?</p> <p>(k) <u>Helmet Mounted Display (HMD)/ Direct Retinal Display (DRD).</u></p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>(i) Are the aircraft systems integrated with a Helmet Mounted Display or Direct Retinal Display?</p> <p>(ii) What does the HMD/ DRD indicate (functions/ information/ modes etc)?</p> <p>(iii) Does the HMD/ DRD have the ability to slave all aircraft sensors to pilot (s) line of sight (LOS) and cue the pilot?</p> <p>(iv) Is it possible to record pilot's line of sight view?</p> <p>(1) <u>Mission Planning and Debrief System (MPDS).</u></p> <p>(i) Is there a provision of Mission Planning, Rehearsal and Retrieval system with the aircraft?</p> <p>(ii) Is it possible to plan a mission on a geographical map underlay?</p> <p>(iii) Is it possible to plan missions from multiple aircraft carriers using a single MPDS?</p> <p>(iv) Is the map cartographical underlay same format as that stored/ utilized by the onboard Digital Map Display system?</p> <p>(v) Does it have a provision for a single point loading and retrieval of mission data?</p> <p>(vi) Is it possible to reconstruct multiple aircraft missions and network these systems located on different aircraft carriers?</p> <p>(vii) Is the MPDS tropicalised and rugged for transportation carriage on aircraft carrier?</p> <p>(viii) Is the MPDS PC based and is there a</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>provision for portable system (tough book/ laptop)?</p> <p>(ix) What are the types, formats and coverage of maps that would be offered with the MPDS?</p>
36.	Identification	<p>(a) What is the type (Mk XII standard or better) of Combined Interrogator Transponder (CIT) (along with Non-Cooperative Target Recognition (NCTR) facility in the radar) fitted on the aircraft?</p> <p>(b) Does the CIT have Mode 'S' facility and does it have the facility for "National Secure Modes" with selective interrogation and crypto transmissions?</p> <p>(c) Is the CIT provided with an "applique" model crypto computer and is it possible for IN to utilize indigenous encryption software on the crypto computer for the National Secure modes?</p> <p>(d) Would it be feasible to fit an Indian origin IFF in the aircraft?</p> <p>(e) Does the aircraft have AIS receiver incorporated?</p>
37.	EW Systems	<p>(a) What are the types and specifications of the EW systems as placed at Annexure II?</p> <p>(b) Is simultaneous operation of EW systems along with the airborne radar possible?</p>
38.	Additional Equipment	<p>Is it feasible to integrate and carry the following additional equipment on the aircraft for carrier operations:-</p> <p>(i) Panoramic cameras, SAR and IR sensors for reconnaissance (Recce Pod).</p> <p>(ii) Thermal imaging systems for navigation and target designation.</p> <p>(iii) Laser Designator Pod (LDP).</p> <p>(iv) ECM and ESM pods.</p> <p>(v) Buddy Refuelling pod.</p>
39.	Data Bus	<p>(a) Is there a provision for integrated avionics</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>open architecture with data exchange on dual redundant digital data bus at high data rates on open standard protocols?</p> <p>(b) What is the data bus loading and would it be possible to enable integration of other systems by the IN?</p> <p>(c) What are the types of data buses used on the aircraft?</p>
40.	Miscellaneous Systems	<p>(a) <u>Flight Data Recorder (FDR).</u></p> <p>(i) Is the aircraft provided with a solid state digital FDR? If yes, is it deployable or not?</p> <p>(ii) Is the recording medium crash and fire proof as per TSO 124C or equivalent standards?</p> <p>(iii) What is the recording capacity for data and audio?</p> <p>(iv) Does the crash proof element have a Sonar Locator Beacon (SLB)? If yes, the details of SLB.</p> <p>(v) Is there a provision of ELT in the aircraft? If yes, the type and details thereof.</p> <p>(vi) Is it possible to retrieve FDR data from the aircraft from a single point?</p> <p>(vii) Is there a provision for playing back the 3D flight profile from the FDR data?</p> <p>(viii) Would it be possible to supply one set of specialized equipment, required for extraction of data from a crashed aircraft FDR?</p> <p>(b) <u>Fatigue Monitoring.</u> Does the aircraft have a facility to monitor and analyse the aircraft fatigue data?</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>(c) <u>Digital Video Recording System (DVRs).</u></p> <p>(i) Is there a provision of solid state multi-channel recording system? If yes, how many channels such as HUD, HMD, MFDs, voice etc (selectable by the pilot) can be simultaneously recorded?</p> <p>(ii) Is the system capable of recording all operationally relevant symbols in the field of view of the HUD, both by day and night?</p> <p>(iii) Is the ground replay station capable of synchronizing the DVRs playbacks with the 3-D reconstruction of flight missions by the Mission Planning and Debrief System?</p> <p>(iv) Is it possible to supply COTS data transfer device and does it have a hardware lock?</p> <p>(d) <u>Autopilot.</u> Is the aircraft autopilot coupled to the nav/ attack system allowing automatic weapon delivery and integrated with auto throttle for precision landing (ashore and onboard the carrier) and does it have adequate built-in redundancy? Does the autopilot have the following modes:-</p> <p>(i) Attitude Stabilization Mode (Bank & Pitch).</p> <p>(ii) Auto Trim Function.</p> <p>(iii) Horizontal and Vertical Navigation Mode.</p> <p>(iv) Course & Track Capture Mode.</p> <p>(v) Altitude Selection Mode.</p> <p>(vi) Altitude Hold Mode (RVSM capability).</p> <p>(vii) Auto Weapon Delivery with the nav/attack system.</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>(viii) MLS/ ILS capture (both Localiser & Glide Slope) and auto land facility, if available.</p> <p>(ix) Critical Altitude Recovery.</p> <p>(x) Critical Attitude Recovery Mode (to recover the aircraft automatically to straight and level flight from an unusual attitude).</p> <p>(e) <u>Anti 'G' Protection.</u> What is the type and capability of anti 'g' suits to be provided with the aircraft?</p> <p>(f) <u>Integral Pilot Ladder.</u> Is the aircraft provisioned with an integral pilot ladder?</p>
41.	Night Flying Capability	<p>(a) Is the external lighting of the aircraft NVG compatible? If yes, then up to which Gen standards?</p> <p>(b) Is there a provision of night formation lights?</p> <p>(c) Is the aircraft capable of carrying out night Air-to-Air Refuelling?</p>
42.	Survivability (System Redundancy)	<p>(a) Is there adequate redundancy for safe recovery of aircraft with at least up to two levels of failures in FBW system?</p> <p>(b) What is the overall probability of loss of control due to FBW failure (.../ hour)?</p> <p>(c) In case of total electrical failure, what is the duration of FBW operations?</p>
<u>Section V - Operational Characteristics</u>		
43.	Take-Off/ Launch	<p>(a) <u>Ski-Jump.</u> Is the aircraft capable of being launched from 13° and 14° Ski-Jumps having a parabolic profile (would be provided on request) using afterburner? If yes, the following are requested.</p> <p>(i) What is the max external payload (state configurations including buddy refuelling configuration) of the aircraft when</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>launched from a take-off distance of 195 m, 190 m, 125m from a deck with 13° Ski-jump and 144 m, 203 m, 213 m from a deck with 14° Ski-jump at ISA + 15° with WOD of 20 and 30 kn and QFE of 1005 hpa in tropical conditions [with and without hold back (Restraining Gear System)]?</p> <p>(ii) If free roll (without hold back) is proposed as one of the standard procedure for launching the aircraft instead of release from RGS, what is the method of ensuring thrust check for safe take-off?</p> <p>(iii) Would the ski-Jump exit velocity provide adequate control in all three axes until the aircraft is fully airborne?</p> <p>(iv) What would be the AOA and minimum ROC of the aircraft post Ski-Jump launch?</p> <p>(v) Does the end speed calculation cater for ship's motion and ramp wake turbulence? If yes, up to what limits (Roll with period, Pitch with period and ... kn WOD).</p> <p>(vi) Quantify margins in ambient conditions (WOD, OAT, RH, cross wind, ship motion etc.) that are accounted in calculation of launch performance for variations between assumed and prevailing conditions.</p> <p>(vii) Is the aircraft capable of launching in OCC configuration?</p> <p>(viii) Is the aircraft capable of manoeuvring on flight deck for safe line up at commencement of roll point in the aft section of IN aircraft carriers?</p> <p>(ix) Is the aircraft cleared to roll over the arresting wires for take-off?</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>(b) <u>Catapult.</u></p> <p>(i) Is the aircraft capable of being launched from conventional steam catapult and EMALS?</p> <p>(ii) If yes, what is the max external payload (state configurations including buddy refuelling configuration) of the aircraft when launched from the deck with C13-1, C13-2 & C13-3 conventional steam catapult or equivalent shot length EMALS at ISA + 15° with WOD of 24 kn & 28 kn at QFE of 1005 hpa?</p> <p>(iii) What is the certified max Launch Weight for CATOBAR? Provide CATOBAR specifications.</p>
44.	Landing (Aircraft Carrier)	<p>(a) <u>Deck Approach and Landing.</u></p> <p>(i) For aircraft carrier approach and landing, what is vision angle below the horizon for over the nose vision at aircraft approach AOA? Does it meet relevant MiL (Mil Std-850B) or equivalent standards?</p> <p>(ii) What is the landing/ arrestment speed (CAS) of the aircraft at normal and maximum carrier landing weight of aircraft (specify weight and configurations cleared for landing) at ISA + 15°C with WOD of 20 and 28 kn and QFE of 1005 hpa in tropical conditions?</p> <p>(iii) Is the aircraft capable of arrestment with Svetlana Arresting Gear fitted on Indian aircraft carriers, Mark 7 Mod 3 arresting gear and AAG? Specify landing Weight Vs WOD combinations considered feasible.</p> <p>(iv) Is the aircraft capable of landing in Operational Clean Configuration at ISA + 15°C with WOD of 20 and 28 kn and QFE of 1005 hpa in tropical conditions?</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>(b) Max Landing Weight. What is the maximum external 'bring back' payload and sink rate of the aircraft with 50% internal fuel onboard at ISA + 15° with WOD of 20 & 28 kn and QFE of 1005 hpa?</p> <p>(c) Barricade Engagement. Is the aircraft capable of engaging emergency barricade onboard (90 m run-out) and ashore?</p> <p>(d) Single Engine Recovery.</p> <p>(i) In case of twin-engine aircraft, is aircraft capable of single engine bolter/ go-around in conditions specified at (d) (iii) below?</p> <p>(ii) In case of twin-engine aircraft, is aircraft capable of single engine recovery on the aircraft carrier with sufficient fuel for two approaches and a bolter?</p> <p>(iii) If yes, what is the CAS of aircraft at ISA + 15°C with WOD of 20 and 28 kn and QFE of 1005 hpa in tropical conditions?</p> <p>(iv) In case of twin-engine aircraft, is aircraft capable of single engine recover in auto-land mode?</p> <p>(e) Auto-Landing. Is the aircraft capable of auto-landing till touchdown on aircraft carrier with associated ship based systems available onboard IN aircraft carriers/ proposed by the vendor?</p>
45.	Climb and Ceiling	<p>(a) What is the operational envelope/ combat ceiling of the aircraft in the Operational Clean Configuration?</p> <p>(b) Using snap-up BVR missiles, what is the maximum altitude of the targets that the aircraft is capable of engaging?</p> <p>(c) What is the initial rate of climb (in terms of maximum specific excess power) in the Operational Clean Configuration at sea level? (This should not be interpreted as an</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>instantaneous zoom climb, but instead computed as specific excess power which is an accepted standard for comparison).</p> <p>(d) What is the time to climb to a height of 33,000 ft with afterburner in the Operational Clean Configuration from ski-jump take-off and catapult launch?</p>
46.	Max/ Min Level Speeds	<p>(a) <u>Sea Level.</u></p> <p>(i) <u>Clean Configuration & OCC.</u> What is the maximum speed of the aircraft with afterburner in clean and OCC?</p> <p>(ii) <u>With Max External Load.</u> What is the maximum speed of the aircraft with afterburner?</p> <p>(b) <u>Max Mach Number (Clean & OCC aircraft).</u> What is the maximum sustainable Mach number of the aircraft at sea level, 10, 000 ft, 20, 000 ft, 30, 000 ft, 42, 500 ft and 50,000 ft ALSL in level flight?</p> <p>(c) <u>Min Level Speeds.</u> What is the minimum speed of the aircraft in straight and level flight at sea level, with 50% of the maximum internal fuel capacity:-</p> <p>(i) In Landing Configuration (with no external load)?</p> <p>(ii) In clean configuration (undercarriage and flaps retracted)?</p> <p>(iii) In OCC (undercarriage and flaps retracted)?</p>
47.	Acceleration (Clean & OCC aircraft with Max Afterburner)	<p>What is the time (in secs) for acceleration under following conditions:-</p> <p>(i) <u>At Sea Level.</u> From 325 to 600 kn?</p> <p>(ii) <u>At 20,000 ft AMSL.</u> From 0.9 M to 1.1 M?</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		(iii) At 36,000 ft AMSL. From 0.9 M to 1.4 M.
48.	Manoeuvrability	<p>(a) Is the aircraft spin resistant?</p> <p>(b) 'g' Envelope. What is the 'g' envelope of the aircraft? What is the maximum sustainable 'g' at sea level in operational clean configuration with afterburner?</p> <p>(c) Turn Performance. What are the Instantaneous Turn Rate (ITR) and Sustained Turn Rate (STR) at sea level in Operational Clean Configuration with afterburner?</p> <p>(d) Rate of Roll. What is the maximum rate of roll of the aircraft in Operational Clean Configuration?</p>
49.	Weapon Load/ Armament	<p>(a) External Stations/ Load.</p> <p>(i) How many external stations (under fuselage/ wings) are available on the aircraft for carriage of a combination of bombs, rockets, air to air and air to surface missiles and ECM / reconnaissance / targeting pods, fuel etc?</p> <p>(ii) What is the load carrying capacity of each station for weapon load carriage?</p> <p>(iii) How many stations are capable of carrying stores of 1,500 kg and 1,200 kg?</p> <p>(iv) Is the aircraft capable of simultaneous carriage of strike load and air-to-air missiles to provide swing-role capability?</p> <p>(b) Gun. What is the type, calibre, Rate of Fire and magazine capacity of integral gun fitted on the aircraft?</p> <p>(c) Navigation and Weapon Delivery. Is the aircraft capable of accurately navigating to the target at all levels and to deliver weapons accurately in a single pass in both level and dive attacks, by day and night? Is the aircraft capable</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>of high altitude weapon release upto an altitude of 40,000 ft)?</p> <p>(d) Weapons. What is the capability of following types of weapons integrated on the aircraft and likely to be offered to IN : -</p> <p>(i) Long/ Medium Range Beyond Visual Range Air to Air Missile [Guidance, LOAL & LOBL min/ max ranges, target parameters (ht envelope, speed, g etc), snap up/ down capability, Close Combat capability, ECCM features, warhead, data link etc].</p> <p>(ii) Short Range Missile [Guidance, LOAL&LOBL min/ max ranges, target parameters (ht envelope, speed, g etc), snap up/ down capability, Close Combat capability, ECCM features, warhead, data link etc].</p> <p>(iii) Anti-Ship Missile [Guidance, min/ max ranges, target parameters (ht envelope, speed, g etc), ECCM features, warhead, data link etc].</p> <p>(iv) Land Attack Missiles (Guidance, min/ max ranges, target characteristics, ECCM features, warhead, data link etc).</p> <p>(v) Anti-Radiation Missiles (Guidance, min/ max ranges, target characteristics, ECCM features, warhead, data link etc).</p> <p>(vi) Precision Guided Munitions (Guidance, min/ max ranges, target characteristics, ECCM features, warhead etc).</p> <p>(vii) Unguided Munitions (weight and calibre of bombs, rockets etc).</p>
50.	Radius of Action/ Loiter time	<p>(a) What is maximum duration the aircraft is capable of carrying out continuous missions with no replenishment of consumables, except fuel?</p> <p>(b) What are the Radii of Action (nm)/ loiter</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>time (min) for Land strike/ CAP/ Anti-shipping/ ML escort/ Buddy Refuelling (fuel offtake table from launch to recovery reserve) in various profiles (HHH/ HLH/ LLL) for configurations cleared for operations from STOBAR and CATOBAR aircraft carrier?</p> <p>(c) The required configurations for above mentioned roles to be sought by the vendor directly from IHQ MoD (N)/ DNAS.</p> <p>Note: - To arrive at Radii of Action and loiter time the considerations to be taken into account are placed at Annexure III.</p>
51.	Deck Launched Interception	<p>(a) What is the minimum time required for a trained pilot to enter the cockpit of a prepared aircraft and complete the engine(s) start?</p> <p>(b) What is the minimum time required for commencing take-off after completing the engine start for Deck Launched Interception (DLI)?</p>
52.	Adaptability and Unilateral Upgrade	<p>(a) Is it possible to integrate the existing and futuristic weapon/ avionics systems of Indian, Russian and Western origin to the aircraft?</p> <p>(b) Do the aircraft's software and computers have the potential for future growth and indigenous unilateral upgrade capability?</p> <p>(c) Does the main mission computer/s have plug and play feature to allow add-on Indian specified electronics and weapon systems?</p>
<u>Section VI - Maintainability, Reliability and Safety Features</u>		
53.	Interchangeability	<p>(a) Will all major airframes components/ parts / panels, sub-assemblies, including the canopy be fully interchangeable between aircraft?</p> <p>(b) What is the degree of modular/ LRU concept used on the aircraft?</p> <p>(c) Is the engine modular in design with separate hot and cold section modules such as low pressure compressor, high pressure compressor, combustion chamber, turbine,</p>

Ser	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>exhaust nozzle etc?</p> <p>(d) Are the engine modules (including engine sub-assemblies) replaceable/ interchangeable, between aircraft, at 'T' level engine repair and is the engine performance testing at 'T' level?</p> <p>(e) Would the OEM be willing to provide ICD and source codes to the Buyer for integration of future indigenous equipment?</p>
54.	Accessibility	<p>(a) Are all components/ parts requiring inspection/ servicing/ repairs easily accessible and permit inspection, servicing, removal or installation?</p> <p>(b) Are the inspection/ access panels standardized with quick release fasteners?</p>
55.	Servicing Requirements	<p>(a) What are the external feeds that are required to service and operate the aircraft?</p> <p>(b) Does the aircraft have Built-in-Test Equipment (BITE) for its systems and what is the coverage?</p> <p>(c) Does the maintenance philosophy of the aircraft permit 'on-condition' maintenance?</p> <p>(d) Are suitable check out points available to enable quick ground check-outs?</p> <p>(e) Does the FADEC have provision for retrieval of engine parameters / failure mode, during its operation by ground crew, through a control test both in dynamic/ static mode? Does the control test set have a provision for engine fault diagnosis and rectification?</p> <p>(f) Does the maintenance philosophy permit all 'O' level (flight line) servicing operations without special maintenance ladders, stands and other special ground equipment?</p> <p>(g) What is the minimum periodicity of first and subsequent scheduled maintenance in flying hours and time period?</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>(h) Is it possible, at 'O' level, to remove and install an engine onboard the aircraft carriers and clear the aircraft for flight in not more than one hour?</p> <p>(j) What are the servicing man hours per flight hour for scheduled first and second line servicing?</p> <p>(k) Is there a provision for cooling of avionics spaces while testing and operation on deck/ ground for extended periods without engine power?</p> <p>(l) Does the aircraft have a computerised health monitoring and maintenance management system for comprehensive management of maintenance activities for the aircraft?</p> <p>(m) Are there any additional servicing requirements for deck operations?</p> <p>(n) Pilot Turn Round Servicing (TRS). Is it possible to carry out pilot TRS by refuelling, BITE and system check without any specialized equipment?</p>
56.	Reliability	<p>(a) What is the reliability of the aircraft as a system for an eight hour mission?</p> <p>(b) What is the MTBF of major systems for maintenance under all Indian environmental conditions?</p> <p>(c) Do the aircraft systems provide high operational reliability and have necessary reliability monitoring provisions?</p> <p>(d) Does the aircraft have any Reliability and Maintainability Program plan which details the methods, definitions, standards and timescales for the in-service phase?</p>
57.	Servicing Periodicity	<p>(a) What are the maximum flying hours possible to operate the aircraft from aircraft carrier/ forward airfields without the need for routine 'I' level servicing?</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>(b) What is the overhaul cycle of the aircraft (in hours)?</p> <p>(c) What is the Time Between Overhauls (TBO) of the hot section and cold section modules of the engine?</p> <p>(d) What is the TTL (in hours) of the hot section and cold section modules of the engine for STOBAR and CATOBAR operations?</p> <p>(e) Would it be possible to provide unrestricted exploitation of all engine modules to achieve complete TBO of the engine?</p> <p>(f) Is Engine 'O' & 'I' level servicing based on on-condition maintenance philosophy?</p> <p>(g) Is the TBO/ TTL of the engine modules matched to avoid multiple maintenance interventions for module change?</p> <p>(h) Mean Time To Repair (MTTR). What is the MTTR for 'O' level servicing?</p> <p>(j) Tropicalisation.</p> <p>(i) What maintenance support equipment and technology would be offered with the aircraft to sustain the aircraft and engine performance under Indian tropical condition?</p> <p>(ii) Is there a requirement of carrying out special preventive maintenance viz. compressor wash, additive sprays etc on the engine, during routine operations and sustained operations?</p>
58.	Storage	What is the servicing requirement during Long Term Storage (with period) and Short Term Storage (with period)?
59.	Total Technical Life (TTL) of aircraft except engine	(a) What is the TTL (in flying hours and calendar years) of aircraft structure, components, systems, sub systems, assemblies etc, with the load spectra specified in Mil Specs or equivalent standards?

Ser	<u>Parameter/ Specification</u>	<u>Queries</u>
		(b) Does the Fatigue monitoring system monitor the fatigue health of critical airframe structures?
60.	Obsolescence Management Plan	(a) What is the obsolescence management plan of the aircraft in the life span of the aircraft? Does the plan offer adequate assurance for life time product support? (b) What is the minimum obsolescence free period (in years) from the date of delivery of the last aircraft?
61.	Simulator/ Ground Training	Vendors to indicate the availability of following training aids for the aircraft:- (i) Fixed base Full Mission Simulators (FMS). (ii) Avionics Part Task Trainers (APTT). (iii) Cockpit Procedure Trainers (CPT). (iv) Aircraft Systems Maintenance Simulator (ASMS). (v) Engine Maintenance Systems Simulator (EMSS). (vi) Navigation and Attack System Maintenance Simulator (NASMS).
62.	Ground Support Equipment (GSE)/ Ground Handling Equipment (GHE)/ Operational Role Equipment (ORE)	(a) What are GSE/ GHE/ ORE/ test/ servicing equipment and tools etc. that would be offered for ashore and afloat operations of the aircraft? (b) Of these, which are COTS equipment?
63.	Electro-Magnetic Compatibility	Are the systems on board the aircraft adequately protected against electromagnetic emissions and do the systems comply with the Mil-Std 461 E/F or equivalent Standards? Would the aircraft be compatible with EMI levels of IN aircraft carrier?
64.	Standardization	(a) Are all broad class of equipment, component and assembly standardized? (b) Which are the applicable military and other quality standards met in the design/selection of the aircraft and equipment?

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		(c) Does the aircraft display flying and associated parameters in “Anglo-Saxon” and/or “Metric” system.
65.	Logistic Support	<p>(a) What is the expected ‘in-service’ life of the aircraft?</p> <p>(b) Publications. Would the vendor supply all publications including Flight Manuals (including performance graphs from STOBAR and CATOBAR aircraft carriers), technical description manuals, servicing schedules, wiring diagrams, illustrated spare parts catalogue, structural repair manuals etc, pertaining to the aircraft, its sub-systems and add-ons in hardcopy and in electronic media (CD/DVD ROM etc.) in English language, prior to the commencement of training on the aircraft?</p> <p>(c) Repair Facilities. Would the vendor supply infrastructure for maintenance of equipment (including specific GSE/ GHE /test/ servicing equipment) at the operational (O) and intermediate (I) levels? Would indigenous items, which are available with the IN, be substituted after mutual discussion with the manufacturer.</p> <p>(d) Does the modular life of components match the overhaul cycle of the aircraft/ engines?</p> <p>(e) What is the depth of Transfer of Technology (ToT) (complete / partial) for Depot (D) level maintenance activity of certain aggregates?</p> <p>(f) In case ‘D’ level activity is not decided upon in India, then will the vendor be prepared to maintain repair facilities for equipment/ subsystems for the proposed life span of the aircraft or as required by the IN?</p> <p>(g) Training. Where and what degree of training will the vendor provide for training of pilots and technicians (including technical and logistics officers)?</p> <p>(h) Life-Cycle Cost. What is the Life Cycle Cost of the aircraft and what are the parameters for computation of life-cycle cost with verifiable</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		analysis of life-cycle cost for life time usage of the aircraft?
66.	Airworthiness Certification	<p>(a) Does the aircraft conform to the current governing military airworthiness regulations of the country of origin?</p> <p>(b) Will the vendor provision a type certificate indicating such conformance?</p> <p>(c) Will the vendor provision a data pack required by Indian Airworthiness Authorities for continued airworthiness of the aircraft?</p> <p>(d) Will the vendor provision service bulletins, service instructions and special technical instructions affecting the airworthiness of the aircraft on a regular basis?</p> <p>(e) Does the aircraft engine conform to Mil-E-5007E and if compliance to any other military standard other than MIL-STD is offered, will the vendor provision compliance documents conforming to Mil-E-5007E?</p> <p>(f) Are all document sets/ publications in English in conformity with latest NATO/ MIL standards/ ATA/ AECMA 1000D/ ATA 100 standard/ IETM level 4 Publications?</p>

Annexure I to Appendix A**AIRBORNE MULTI MODE RADAR**

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
<u>Section I - General</u>		
1.	General	<p>(a) Is the aircraft fitted with multi-mode 'Active Electronically Scanned Array' (AESA) radar?</p> <p>(b) Upto what percentage of failure of the Transmit/ Receive modules can the radar retain its performance?</p> <p>(c) Does the radar have the capability to carry out simultaneous Air to Air and Air to Surface modes of operation?</p> <p>(d) Does the radar have an initiated, continuous, maintenance and power-on BIT mode?</p> <p>(e) What is the power output of the radar in various modes?</p>
<u>Section II - Air to Air</u>		
2.	Modes of operation	<p>What are the Air to Air modes of operation and does it include the following modes:-</p> <p>(i) Multi Target Detection and Track.</p> <p>(ii) Multi Target Air Combat Manoeuvring.</p> <p>(iii) High Resolution Multi Target Tracking.</p>
3.	Velocity Search	<p>(a) What is the minimum range (nm) for detecting a target with an RCS of 5 m² and 3.5 m²?</p> <p>(b) What is the range rate (m/s) difference at which the radar is able to discern two targets?</p> <p>(c) What are the scanned zones (deg) in azimuth and elevation?</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
4.	Search While Track (SWT) Mode	<p>(a) Scanned Zones. What are the scanned zones (deg) in azimuth and elevation?</p> <p>(b) Range. What is the minimum range (nm) for detecting a target with an RCS of 5 m² and 3.5 m² (Probability of Detection = 0.9) in head on mode?</p> <p>(c) What is the minimum range (nm) for detecting a target with an RCS of 5 m² and 3.5 m² (Probability of Detection = 0.9) in tail on mode?</p> <p>(d) How many targets can be displayed on radar display and how many on SWT?</p> <p>(e) On how many targets is the Firing solution with AAM possible simultaneously?</p> <p>(f) Is there a provision with the pilot for overriding the combat logic in terms of scan zones range selection and manual designation of priority?</p>
5.	Raid Assessment Mode	<p>(a) What is the minimum distance (m) between two targets so as to distinguish and display targets individually?</p> <p>(b) Up to what range (nm) can the pilot select the scan volume for the mode?</p> <p>(c) What are the scanned zones (deg) in azimuth and elevation?</p>
6.	Computation of intercept and Firing Solution	<p>(a) Is this facility available in SWT and Raid Assessment mode?</p> <p>(b) Is the firing and intercept solution possible on a designated target in the Raid Assessment mode?</p>
7.	Performance Against Slow Speed Targets	<p>(a) What is the Doppler discrimination (range in m/s) capability of the radar?</p> <p>(b) Are the Doppler discrimination values selectable by the pilot?</p>
8.	Mutual Interference	<p>(a) How many aircraft are able to operate in close proximity (in all relative positions and without any mutual interference), while operating</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>any mode of the radar?</p> <p>(b) How many spot frequencies are provided?</p>
9.	Firing of Active/ Semi-Active Missiles	<p>(a) Does the radar support active missiles by providing them with accurate data, missile envelope calculations and uplink communication?</p> <p>(b) Does the radar support Semi-active missiles by providing target data, required RF modulations and uplink communication?</p> <p>(c) How many missiles can be fired simultaneously in the SWT/ Raid Assessment mode?</p> <p>(d) Is there a provision of reverse slaving (missile to radar) in the Close Combat Mode?</p>
10.	Non-Co-operative Target Recognition (NCTR)	<p>(a) Does the radar have a NCTR mode and how many targets can it recognize?</p> <p>(b) Is the NCTR mode operative in all modes where AAMs are required to be fired with radar inputs?</p> <p>(c) Will the facility for programming additional targets be provided to the IN?</p>
11.	Close Combat Mode	<p>(a) Are Close combat modes slewable under pilot / HMD control?</p> <p>(b) Does the radar support IR missiles by providing accurate data for seeker slaving and missile envelope calculation?</p> <p>(c) What is the lock-on range in Close Combat Mode?</p> <p>(d) Vendor to confirm the availability of following combat modes:-</p> <p>(i) <u>Helmet Mounted Display (HMD) Mode.</u> The radar and missile heads are slaved to the HMD. The radars bore-sight is slaved to the HMD LOS and lock-on is on demand, with in the radar scan area.</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>(ii) <u>Plane of Symmetry Mode.</u> Minimum \pm ... degree in elevation and \pm degree in azimuth. Auto lock on facility is provided.</p> <p>(iii) <u>HUD FOV.</u> HUD FOV is scanned. Auto lock on facility is provided</p> <p>(iv) <u>Sector Search.</u> Pilot designated sector is searched and auto lock on facility is provided.</p>
12.	Reversed Slaving/ Slaving	<p>(a) Are all active and IR Air to Air weapons slaved to the radar and is reverse slaving facility provided?</p> <p>(b) Is Auto lock-on facility provided with reverse slaving?</p>
13.	Training/ Peace Time Mode	<p>(a) Vendor to confirm availability of several spot frequencies and that the radar has an in-built and procedural feature that would permit its use for training/ during peace time without compromising its wartime operational characteristics/ parameters.</p> <p>(b) Is activation of ECCM features, especially those which induce the radar to change its operating frequency, and other relevant parameters on encountering active/ passive jamming manually selectable?</p>
<u>Section III - Air to Ground</u>		
14.	Modes of operation	<p>What are the Air to Ground modes of operation and does it include the following modes:-</p> <p>(i) Real Beam Mapping (RBM).</p> <p>(ii) Doppler Beam Sharpening (DBS).</p> <p>(iii) Synthetic Aperture Radar (SAR).</p> <p>(iv) Ground Moving Target Indication (GMTI) over RBM/DBS/SAR.</p> <p>(v) Ground Moving Target Track (GMTT) over RBM/DBS/SAR.</p>

Ser	Parameter/ Specification	Queries																
		(vi) Ground Target (Stationary) Track (GTT). (vii) Air to Ground Ranging. (viii) Weather. (ix) Terrain Avoidance.																
15.	RBM mode	(a) What is the maximum range in this mode? (b) What is the National Image Interpretability Rating Scales (NIIRS) rating of the images? (c) In this mode, are zoom and freeze functions provided?																
16.	DBS Mode	What is the maximum range and resolution of following patch sizes in the DBS mode:- <table border="1" data-bbox="639 958 1217 1216"> <thead> <tr> <th>Patch Size (nm)</th> <th>Resolution Cell Size (m)</th> </tr> </thead> <tbody> <tr> <td>12 X 12</td> <td></td> </tr> <tr> <td>24 X 24</td> <td></td> </tr> </tbody> </table>	Patch Size (nm)	Resolution Cell Size (m)	12 X 12		24 X 24											
Patch Size (nm)	Resolution Cell Size (m)																	
12 X 12																		
24 X 24																		
17.	SAR	(a) What is the minimum ground map resolution in the SAR mode? (b) What is the National Image Interpretability Rating Scales (NIIRS) rating of the images? (c) What is the resolution and ranges in the SAR mode:- <table border="1" data-bbox="639 1568 1402 1951"> <thead> <tr> <th>Patch Size (nm)</th> <th>Resolution Cell Size (m)</th> <th>Maximum Patch Range (nm)</th> <th>NIIRS rating</th> </tr> </thead> <tbody> <tr> <td>1 X 1</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2 X 2</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4 X 4</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Patch Size (nm)	Resolution Cell Size (m)	Maximum Patch Range (nm)	NIIRS rating	1 X 1				2 X 2				4 X 4			
Patch Size (nm)	Resolution Cell Size (m)	Maximum Patch Range (nm)	NIIRS rating															
1 X 1																		
2 X 2																		
4 X 4																		
18.	GMTI/ GMTT	(a) What is the maximum range and accuracy for 50 m ² target in GMTI mode?																

Ser	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>(b) Ground targets with radial velocity (m/s) permit their selection in GMTI mode.</p> <p>(c) Is it possible for designation transition to a weapon aiming solution in GMTI and GMTT?</p> <p>(d) What are the angular and velocity accuracies in GMTT mode?</p>
19.	Air to Ground Ranging	<p>(a) Is Air to Ground tagging facility provided?</p> <p>(b) What is the accuracy (in %) provided at varying grazing angles and ranges?</p> <p>(c) At a range of at least 16 nm, what is the accuracy (in %) provided at grazing angles > 10°?</p>
20.	Air to Ground Mapping Features	<p>(a) In this mode, is the range selectable by the pilot and are zoom and freeze functions provided?</p> <p>(b) In this mode, is it possible to update the navigation system?</p> <p>(c) Does the Freeze function permit transition to weapon delivery?</p> <p>(d) Does the resolution in DBS permit recognition of 10 m X 10 m X10 m structure or better?</p> <p>(e) In SAR mode, at what range is a resolution better than 3 m X 3 m X 3 m available (in nm/km)?</p> <p>(f) Is the spot light mode available on DBS and SAR mapping and is it possible to designate targets on these modes for weapon delivery?</p>
<u>Section IV - Navigation</u>		
21.	Terrain Avoidance	<p>(a) Is terrain avoidance using ground-mapping modes available?</p> <p>(b) In this mode, does the radar cross refer the information available from FLIR?</p> <p>(c) What is the maximum obstacle detection range?</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		(d) What is the accuracy (m) at warning range of < 2.5 km and clearance plane of <u>+ 30 m</u> ?
22.	Weather	<p>(a) What are the ranges (in nm/km) of radar in this mode for cumulonimbus and nimbostratus clouds?</p> <p>(b) Is there a provision for overlaying weather picture on NAV modes (route waypoints, runway targets etc)?</p>
<u>Section V - Air to Sea</u>		
23.	Modes of operation	<p>What are the Air to Sea modes of operation and does it include the following modes:-</p> <p>(i) Sea Surveillance and Search While Track.</p> <p>(ii) Sea Target Continuous Track (STCT).</p> <p>(iii) Range Signature.</p> <p>(iv) Inverse Synthetic Aperture Radar (ISAR).</p>
24.	Sea Surveillance and Search While Track	<p>(a) Is RBM painting of coast line and sea targets possible in this mode?</p> <p>(b) What is the maximum operational range of the radar in this mode?</p> <p>(c) What is the maximum number and velocity range (m/s) of targets that can be displayed and designated?</p> <p>(d) Is raw and synthetic output available?</p> <p>(e) Are Freeze and SWT functions available?</p> <p>(f) Does the radar generate course and velocity of targets?</p> <p>(g) Is there a provision to de-clutter sea targets depending on their velocity selectable by the pilot?</p>

Ser	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>(h) What is the range (m) and angular resolution in this mode?</p> <p>(j) Does the radar have the capability to provide a computed radar picture of sea targets in the radar silent mode, with high accuracy? If yes, upto what range?</p>
25.	Surface Target Continuous Track (STCT)	<p>(a) How many targets can be acquired and tracked simultaneously in this mode?</p> <p>(b) What is the maximum tracking range in this mode?</p> <p>(c) What is the velocity (m/s), angular (mrad) and range (m) accuracy in this mode?</p> <p>(d) Is simultaneous launch of two anti-shiping missiles/ PGMs possible in this mode?</p>
26.	Range Signature	<p>(a) What is the maximum range in this mode?</p> <p>(b) What is the detection range of 300 m² RCS target?</p> <p>(c) Is there a provision to measure length of the target? If yes, what is the length measurement error?</p>
27.	Inverse Synthetic Aperture Radar (ISAR)	<p>(a) What is the maximum range in this mode?</p> <p>(b) What is the detection range of 300 m² RCS target?</p> <p>(c) Does the displayed silhouette provide positive identification of the sea targets?</p> <p>(d) Is there an auto-correlation feature in this mode?</p> <p>(e) Does it have zoom and freeze feature?</p> <p>(f) Can the system automatically compare the ISAR image with an onboard library and display matches for identification?</p>

Annexure II to Appendix A**EW SYSTEMS**

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
<u>Section I – General</u>		
1.	General	<p>(a) Are the systems capable of operating at full operational envelope of the aircraft?</p> <p>(b) Do the systems have BIT capability (Power On, Periodic and Initiated) and can serviceability of the system be displayed?</p> <p>(c) Is there provision of Mission Planning (Windows/ Linux based) with appropriate uploading and downloading facility between the aircraft and mission-planning generator either through a suitable secure media?</p> <p>(d) Would the vendor provide the capability for in-country programming (or Pre-Flight Message Generation (PFMG)) to the IN with intelligence data sourced either through the vendor (to be discussed) or generated by the IN?</p> <p>(e) <u>Associated Support Services.</u> Would the vendor provide test equipment, tools, training and publications for O and I level of maintenance, for all the systems?</p> <p>(f) Will the vendor provide spares, publications for all systems (in hard and soft copy), product support and ‘D’ level maintenance as per mutually agreed terms?</p> <p>(g) <u>Power Requirements.</u> Are systems capable of being operated by the aircraft power supply and also able to receive power supply directly from the ground power supply unit for maintenance without the a necessity to power up the complete ac?</p> <p>(h) <u>Environmental Specifications.</u> Do all the systems comply with Mil standards applicable for airborne military applications?</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>		
		<p>(j) Integration of EW Systems. Are all the EW systems, viz RWR, ASPJ, CMDS and MAWS etc integrated to ensure proper time sharing and no interference between each other and with the onboard radar?</p> <p>(k) Is sensor fusion capability, including for data from the 'operational data link' provided?</p> <p>(l) How many onboard emitters such as radar, IFF etc can be blanked in the EW system? Will there be scope to add blanking pulse in future?</p>		
2.	EW systems	<p>Does the EW suite of the aircraft include the following equipment:-</p> <p>(i) Radar Warning Receiver (RWR).</p> <p>(ii) Missile Approach Warning System (MAWS).</p> <p>(iii) Internal ECM Systems (HBJ & LBJ).</p> <p>(iv) Counter Measure Dispenser System (CMDS).</p> <p>(v) Laser Warning Receiver (LWR).</p> <p>(vi) Towed Decoy Capability.</p>		
<u>Section II - RWR</u>				
3.	System capability	<p>(a) Does the RWR provide capability of intercepting, identifying and prioritizing multiple airborne and ground based RF emitters?</p> <p>(b) Is the system flight line programmable?</p> <p>(c) Is it capable of cueing an onboard active jammer, CMDS, MAWS and Towed Decoy for handling threats?</p>		
4.	System specifications	<u>Ser</u>	<u>Specification</u>	<u>Characteristic</u>
		(a)	Frequency Coverage	Present and anticipated future expansion in

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>	
			GHz.
		(b)	DF Accuracy (i) All around and specifically in frontal sector in deg RMS value. (ii) Is there a provision to discriminate between and indicate threats in the upper and lower hemisphere?
		(c)	Can the system handle following threats:-
		(i)	Signal Type Pulse, Pulse Doppler, CW, ICW, Pulse Compression
		(ii)	Frequency Type Fixed, Pulse to Pulse and Batch to Batch agile
		(iii)	PRI Type Fixed and agile including stagger, switcher and jitter
		(d)	Spatial Coverage In deg for azimuth and elevation.
		(e)	Pulse density handling In PPS over the complete frequency band.
		(f)	Sensitivity (at RF input port) dBm (installed).
		(g)	Dynamic Range Minimum ...dB.
		(h)	Protection Limit dBm.
		(j)	Interface Requirements Is it possible to interface RWR with MAWS and CMDS, ASPJ, Primary/Secondary Radar, Towed decoy, other on board avionics systems and real time

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>	
			Data Link?
		(k)	Threat Library (i) Number of libraries with number of threats each. (ii) Will re-programming facility be provided? (iii) What is the maximum number of threats that can be displayed simultaneously?
		(l)	Measurable Parameters Is there a provision to measure PRI, frequency, pulse width, angle of arrival, time of arrival, amplitude, antenna rotation/scan period, emitter mode etc?
		(m)	PRI Range ... μ sec to ... msec (... nsec resolution).
		(n)	Pulse Width Range to ... μ sec (with ... nsec resolution).
		(p)	Frequency Measurement Accuracy \pm MHz.
		(q)	System Response Time Less than sec (worst-case).
<u>Section III – MAWS</u>			
5.	System Capability	(a) What is the type of MAWS (IR or UV based)? (b) Is it capable of detecting any Air Launched and Ground Launched missiles? (c) Is MAWS capable of cueing the CMDS (integrated operation) for initiating countermeasures	

Ser	Parameter/ Specification	Queries																																								
		against approaching missiles? (d) Is the MAWS capable of discriminating between the missile and a rapidly closing aircraft?																																								
6.	System Specifications	Ser	<table border="1"> <thead> <tr> <th data-bbox="663 439 746 555"></th> <th data-bbox="746 439 970 555">Specification</th> <th data-bbox="970 439 1417 555">Characteristic</th> </tr> </thead> <tbody> <tr> <td data-bbox="663 555 746 622">(a)</td> <td data-bbox="746 555 970 622">Sensitivity</td> <td data-bbox="970 555 1417 622">Better than W/cm².</td> </tr> <tr> <td data-bbox="663 622 746 712">(b)</td> <td data-bbox="746 622 970 712">Detection envelope</td> <td data-bbox="970 622 1417 712"></td> </tr> <tr> <td data-bbox="663 712 746 801">(i)</td> <td data-bbox="746 712 970 801">Maximum Range</td> <td data-bbox="970 712 1417 801">.... Km.</td> </tr> <tr> <td data-bbox="663 801 746 891">(ii)</td> <td data-bbox="746 801 970 891">Minimum Range</td> <td data-bbox="970 801 1417 891">.... M.</td> </tr> <tr> <td data-bbox="663 891 746 1003">(iii)</td> <td data-bbox="746 891 970 1003">Coverage</td> <td data-bbox="970 891 1417 1003">Azimuth and Elevation in deg.</td> </tr> <tr> <td data-bbox="663 1003 746 1070">(c)</td> <td data-bbox="746 1003 970 1070">Reaction Time</td> <td data-bbox="970 1003 1417 1070">Less than ... sec.</td> </tr> <tr> <td data-bbox="663 1070 746 1205">(d)</td> <td data-bbox="746 1070 970 1205">False Alarm Rate</td> <td data-bbox="970 1070 1417 1205">Better than ... in ... flying hrs in high clutter conditions.</td> </tr> <tr> <td data-bbox="663 1205 746 1272">(e)</td> <td data-bbox="746 1205 970 1272">DF Accuracy</td> <td data-bbox="970 1205 1417 1272">Better than deg RMS.</td> </tr> <tr> <td data-bbox="663 1272 746 1361">(f)</td> <td data-bbox="746 1272 970 1361">Probability of detection</td> <td data-bbox="970 1272 1417 1361">Better than ... %.</td> </tr> <tr> <td data-bbox="663 1361 746 1451">(g)</td> <td data-bbox="746 1361 970 1451">Target Approach speed</td> <td data-bbox="970 1361 1417 1451">min to max in m/s.</td> </tr> <tr> <td data-bbox="663 1451 746 1563">(h)</td> <td data-bbox="746 1451 970 1563">Multi Threat capability</td> <td data-bbox="970 1451 1417 1563">Number and type of threats is can address.</td> </tr> <tr> <td data-bbox="663 1563 746 2020">(j)</td> <td data-bbox="746 1563 970 2020">Threat Library</td> <td data-bbox="970 1563 1417 2020"> (i) Number of libraries with number of threats each. (ii) Will re-programming facility be provided? (iii) What is the minimum number of threats that can be displayed? </td> </tr> </tbody> </table>		Specification	Characteristic	(a)	Sensitivity	Better than W/cm ² .	(b)	Detection envelope		(i)	Maximum Range Km.	(ii)	Minimum Range M.	(iii)	Coverage	Azimuth and Elevation in deg.	(c)	Reaction Time	Less than ... sec.	(d)	False Alarm Rate	Better than ... in ... flying hrs in high clutter conditions.	(e)	DF Accuracy	Better than deg RMS.	(f)	Probability of detection	Better than ... %.	(g)	Target Approach speed	min to max in m/s.	(h)	Multi Threat capability	Number and type of threats is can address.	(j)	Threat Library	(i) Number of libraries with number of threats each. (ii) Will re-programming facility be provided? (iii) What is the minimum number of threats that can be displayed?
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<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
7.	System Features	<p>(a) Is the system capable of operating in stand-alone and cued modes of operations with other systems like RWR, CMDS etc?</p> <p>(b) Is there a provision of audio and visual alarm to indicate presence of missile and do the warnings disappear once the threat is identified as non-threatening (either absence of threat or successful decoying of threat)?</p> <p>(c) Recording Facility. Is the system capable of recording all operational events along with time stamp for post mission analysis?</p> <p>(d) Prioritization. Is the system capable of prioritising threats in a multi threat scenario?</p> <p>(e) Is the system capable of all-weather operation, unaffected by atmospheric conditions within max detection range and capable of detecting missiles in any background environment?</p> <p>(f) Display. Is the display NVG compatible?</p> <p>(g) Does the system have embedded training mode for simulating threats and to assess the correct cueing capabilities with appropriate indications?</p>
<u>Section IV – Airborne Self Protection Jammer (ASPJ)</u>		
8.	Threat Environment	<p>(a) What are the types of radars that the ASPJ can handle?</p> <p>(b) Is the ASPJ effective against threat radars using one or more state of the art ECCM features? If yes, which ECCM features is it capable of handling?</p>
9.	System Capability	<p>(a) Is the system fully automatic, computer controlled and state of the art with provision for pilot intervention?</p> <p>(b) Is it capable of intercepting, analysing, categorizing, prioritizing and initiating optimal counter-action against multiple threats in a dense environment by noise cum active deception jamming</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>		
		in front and rear hemispheres? (c) Is it software programmable? (a) Is the SPJ basic architecture configurable as an internal system?		
10.	System Specification	<u>Ser</u>	<u>Specification</u>	<u>Characteristic</u>
		(a)	Frequency Range	... to ... GHz (internal and external SPJ)
		(b)	Effective Radiated Power (EPR)	What is the EPR to tackle all the envisaged RF threats and to adequately protect itself during its entire flight in high density EM spectrum?
		(c)	Coverage	What is the azimuth and elevation in deg in forward and aft sectors?
		(d)	Polarisation	Is the system capable of countering all types of polarizations employed by threat radars?
		(e)	Threat countering	How many threats is the system capable of countering simultaneously?
		(f)	Pulse Density	upto ... million pulses per second at any frequency
		(g)	Sensitivity (at RF input port) dBm (installed).
		(h)	Dynamic Range	Minimum ...dB.
		(j)	Protection Limit dBm.
		(k)	Field MTBF hrs

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>	
		(l)	Threat Library Stores data of emitters
11.	Jamming Techniques	<p>(a) Are the ECM techniques provided capable of countering all new generation radars?</p> <p>(b) Does the system provide ECM techniques enumerated below?</p> <p>(c) Noise.</p> <p>(i) Barrage upto MHz.</p> <p>(ii) Narrow band noise jamming.</p> <p>(iii) Doppler noise jamming.</p> <p>(iv) Comb noise jamming.</p> <p>(d) Deception.</p> <p>(i) RGPO, RGPI.</p> <p>(ii) VGPO, VGPI.</p> <p>(iii) Random Range Programming.</p> <p>(iv) Cover Pulse.</p> <p>(v) Multi Target Generation</p> <p>(vi) ICS.</p> <p>(vii) SSW.</p> <p>(viii) Combination of two or more of above techniques as alternative techniques.</p> <p>(e) What is the power output in above mentioned modes?</p>	
12.	System Features	(a) Are there adequate number of technique generators, RF channels and PRI trackers so that optimal ECM techniques will counter each threat	

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>under all possible combinations?</p> <p>(b) Is the system capable of integrated operation with RWR, CMDS and Radar?</p> <p>(c) Does the system architecture have adequate flexibility to accommodate an external jammer (say a towed decoy) using the SPJ techniques generator resources?</p> <p>(d) Is BIT facility available in the system?</p> <p>(e) Is system control possible through a multi-function display and control unit?</p> <p>(f) <u>Recording and Flight Information Retrieval.</u> Does the system have the facility to record all the threats encountered and jammed faults occurred with a time reference stamp for each event?</p> <p>(g) Is the EW data loading and retrieval possible through a portable cartridge at a single point in the cockpit?</p> <p>(h) Is programming of the ASPJ and playback of recorded data possible on a single workstation?</p> <p>(j) <u>Emitter Lockout Facility.</u> Does the system have the flexibility to lockout friendly emitters through pre-flight message?</p>
<u>Section V – Counter Measure Dispensing System (CMDS)</u>		
13.	System Capability	<p>(a) How effective is the CMDS in providing self-protection to the aircraft against radar controlled weapons and IR seeking missiles?</p> <p>(b) Is the CMDS fully programmable and capable of dispensing chaff/ IR flares?</p> <p>(c) Would the vendor provide chaff and flares for optimum aircraft protection against modern missile systems? If yes, what are the types of chaff and flares (multi-spectral) likely to be offered?</p>
14.	System features	(a) Is the system microprocessor based and

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>
		<p>capable of independent as well as simultaneous dispensations as per selection with capability to dispense combination of payloads?</p> <p>(b) Is the system capable of programming various dispensation programs and patterns through the mission-planning system provided to IN?</p> <p>(c) Is there a feature of automatic reset and update of inventory upon power up?</p> <p>(d) Is the system capable of detection of misfires and corrections? If yes, in how much time (msec) is the correction possible?</p> <p>(e) What is the minimum firing interval between two successive carts?</p> <p>(f) Is the system interfaced with RWR, SPJ and MAWS for automatic/ semi-automatic dispensation of expendables appropriate to the threat environment?</p> <p>(g) Is the system able to display the current CMDS status inventory, BIT results, mode of operation etc?</p> <p>(h) Is the system display NVG compatible?</p> <p>(j) Is there a provision of recording of events with a common time stamp with RWR and MAWS?</p> <p>(k) Does the system record BIT results and pilot actions encountered during operation for post sortie analysis?</p> <p>(l) Auto Fire Delay. Is there a provision for programmable delay in auto mode between the appearance of warning message "In Fire" and the moment of actual firing?</p> <p>(m) Will re-programming capability be provided to the IN?</p>
15.	Modes of Operation and Control	Is the system provided with the following user selectable modes of operation:-

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>															
		<p>(i) <u>Manual Mode.</u></p> <p>(aa) Dispense Mode.</p> <p>(ab) Escape Mode.</p> <p>(ac) Jettison Mode.</p> <p>(ad) Terminate Mode.</p> <p>(ii) RWR/ MAWS/ ASPJ Automatic Mode.</p> <p>(iii) RWR/MAWS/ASPJ Semi-Automatic Mode.</p> <p>(iv) Autonomous Mode.</p> <p>(v) Critical Quantity feature in Autonomous Mode.</p>															
<u>Section VI – Laser Warning Receiver (LWR)</u>																	
16.	System Capabilities	<p>(a) Is the system capable of detecting direct incidence of multiple laser range finders, designators, and target illuminators (command guidance pulse trains) and identifying them simultaneously?</p> <p>(b) Is the system capable of discriminating between laser source and other non-coherent sources of radiation such as flash lamp and arc welder etc as well as reject reflected beams?</p>															
17.	System Specifications	<table border="1"> <thead> <tr> <th><u>Ser</u></th> <th><u>Specification</u></th> <th><u>Characteristic</u></th> </tr> </thead> <tbody> <tr> <td>(a)</td> <td>Spatial coverage</td> <td>Azimuth and Elevation in deg.</td> </tr> <tr> <td>(b)</td> <td>Wavelength coverage</td> <td>... to ... μm.</td> </tr> <tr> <td>(c)</td> <td>Sensitivity</td> <td>..... W/ m^2 in high clutter conditions.</td> </tr> <tr> <td>(d)</td> <td>Pulse Width</td> <td>CW – nsec.</td> </tr> </tbody> </table>	<u>Ser</u>	<u>Specification</u>	<u>Characteristic</u>	(a)	Spatial coverage	Azimuth and Elevation in deg.	(b)	Wavelength coverage	... to ... μm .	(c)	Sensitivity W/ m^2 in high clutter conditions.	(d)	Pulse Width	CW – nsec.
<u>Ser</u>	<u>Specification</u>	<u>Characteristic</u>															
(a)	Spatial coverage	Azimuth and Elevation in deg.															
(b)	Wavelength coverage	... to ... μm .															
(c)	Sensitivity W/ m^2 in high clutter conditions.															
(d)	Pulse Width	CW – nsec.															

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>	
		(e)	PRF CW – KHz.
		(f)	DF accuracy Better than deg RMS.
		(g)	Probability of intercept
		(i)	Multiple Pulses Better than ... %.
		(ii)	Single Pulse Better than ... %.
		(h)	Threat Coverage What are the types of Lasers the system can detect?
		(j)	Dynamic range Better than dB.
		(k)	False Alarm Rate Better than ... in ... flying hrs in high clutter conditions.
		(l)	Reaction Time Better than sec.
		(m)	Detection Range Maximum ... km & minimum ... m.
		(n)	Azimuth AOA ... deg.
		(p)	Multi threat handling threats or more.
18.	System Features	<p>(a) Does the system have audio and visual alarm to indicate presence of missile and do the warnings disappear once the threat is identified as non – threatening (either absence of threat or successful decoying of threat)?</p> <p>(b) Recording Facility. Is the system capable of recording all operational events along with time stamp, for post mission analysis?</p> <p>(c) Mission Planning. Is there a provision of PC based system mission planning with appropriate uploading system to ac and down loading system from ac to the computer for post mission analysis?</p> <p>(d) Prioritisation. Is the system capable of prioritising threats in a multi threat scenario?</p>	

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>		
		(e) Blanking . Does the system have built in capability to suppress LWR when captive on board Laser Range Finder (LRF) is in operation?		
Section VII – Towed Decoys				
19.	System Configuration and specifications	<u>Ser</u>	<u>Description</u>	<u>Characteristics</u>
		(a)	Frequency of operation	... to GHz.
		(b)	RCS enhancement	Front and rear.
		(c)	Weight of decoy system Kg/ lbs.
		(d)	Spatial Coverage	Azimuth and elevation in deg.
		(e)	Antenna System type	
		(f)	Antenna Polarisation	Is it able to counter all types of polarization employed by the threat radar?
		(g)	ERP	What is the ERP to tackle all envisaged RF threats and to adequately protect the platform during entire flight in high density EM spectrum?
		(h)	Threat Handling	How many threats is the system capable of countering simultaneously and what are the types of threats it is capable of countering?
		(j)	Operational Handling	(a) Does it impede the ac manoeuvrability or the operational envelope?

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>	
			<p>(b) What is the in-flight reel – in and reel – out rate of decoy?</p> <p>(c) Is there a provision to drop the decoy using a parachute?</p>
		(k)	<p>Deployment</p> <p>(a) Is the deployment of the decoy automatic or manual (with control in the cockpit)?</p> <p>(b) Is there a provision of automatic deployment of second decoy in case first deployed decoy is lost due to threat interaction or malfunction?</p>
		(l)	<p>Deception Techniques</p> <p>(a) Does the system provide ECM techniques enumerated against Pulse, CW & Pulse Doppler radars?</p> <p>(b) What are the special techniques against radar ECCM?</p> <p>(c) What are the techniques to protect the decoy body?</p>
		(m)	<p>Technique Generation Characteristics</p> <p>What are technique generation characteristics of decoy?</p>
		(n)	<p>Programming</p> <p>Is the threat library Flight Line Software Programmable and re-programmable (with facility provisioned)?</p>
		(p)	<p>Communication</p> <p>Does it conform to MiL</p>

<u>Ser</u>	<u>Parameter/ Specification</u>	<u>Queries</u>		
				Std 1553?
		(q)	Tow cable	What is the construction and material of tow cable?

Annexure III to Appendix A**CONSIDERATIONS FOR CALCULATING ROA AND LOITER TIME**

1. To calculate the fuel allowance for take-off, the following criteria should be taken into consideration:-

(a) Afterburner to be switched off only when climb speeds are achieved in a Hi-Lo-Hi mission.

(b) Afterburner to be switched off on achieving the tactical speeds in a Lo-Lo mission.

(c) Fuel allowance for startup and taxi is to be taken as equivalent to 10 min of running all engines at Ground Idle.

2. **Operational Reserve.** All operational profiles should include a combat reserve of 5 min with 3 min at max dry and 2 min at max afterburner setting and a standard recovery fuel allowance. Combat reserve should be at low level and at a speed of 490 Kn.

3. **Recovery Reserve.** The ROA and loiter times to be provide considering recovery reserves under the following conditions: -

(a) **Condition I.** An economical cruise for 80 nm at an altitude of 5000 ft and a circuit and overshoot followed by a circuit and landing on the carrier.

(b) **Condition II.**

(i) An economical cruise for 80 nm at an altitude of 5000 ft.

(ii) 3 VFR Bolters or 2 IFR bolters, whichever requires more fuel.

(iii) Landing Hold for 5 min.

(iv) 5% of initial fuel (Internal + External).

INFORMATION PROFORMA
(INDIAN VENDORS)

1. **Name of the Vendor/Company/Firm.**
(Company profile, in brief, to be attached)

2. **Type (Tick the relevant category).**

 Original Equipment Manufacturer (OEM) Yes/No
 Authorised Vendor of foreign Firm Yes/No (attach details, if yes)
 Others (give specific details)

3. **Contact Details.**
 Postal Address:

 City : _____ State : _____
 Pin Code : _____ Tele : _____
 Fax : _____ URL/Web Site: _____

4. Local Branch/Liaison Office in Delhi (if any).
 Name & Address: _____
 Pin code: _____ Tel: _____ Fax: _____

5. **Financial Details.**
 - (a) Category of Industry (Large/medium/small Scale)
 - (b) Annual turn over: _____ (in INR)
 - (c) Number of employees in firm:
 - (d) Details of manufacturing infrastructure:
 - (e) Earlier contracts with Indian Ministry of Defence/Government agencies:
 Contract Number, Equipment, Quantity, Cost

6. **Certification by Quality Assurance Organisation.**
 - (a) Name of Agency
 - (b) Certification
 - (c) Applicable from (Date & Year)

(d) Valid till (Date & Year)

7. **Details of Registration.**

Agency Registration No. Validity (Date) Equipment
 DGS&D
 DGQA/DGAQA/DGNAI
 OFB
 DRDO
 Any other Government Agency

8. **Membership of FICCI/ASSOCHAM/CII or other Industrial Associations.**

(Name of Organisation, Membership Number)

9. **Equipment/Product Profile (to be submitted for each product separately)**

(a) Name of Product:

(b) Description (attach technical literature):

(c) Whether OEM or Integrator:

(d) Name and address of Foreign collaborator (if any):

(e) Industrial Licence Number:

(f) Indigenous component of the product (in percentage):

(g) Status (in service /design & development stage):

(h) Production capacity per annum:

(j) Countries/agencies where equipment supplied earlier (give details of quantity supplied):

(k) Estimated price of the equipment:

10. Alternatives for meeting the objectives of the equipment set forth in the RFR.

11. Any other relevant information.

12. **Declaration.** It is certified that the above information is true and any changes will be intimated within five (05) working days of occurrence.

(Authorised Signatory)

INFORMATION PROFORMA
(FOREIGN VENDORS)

1. **Name of the Vendor/Company/Firm.**
(Company profile, in brief, to be attached)

2. **Type (Tick the relevant category).**

Original Equipment Manufacturer (OEM): Yes/No

Government sponsored Export Agency: Yes/No (Details of registration to be provided)

Authorised Vendor of OEM: Yes/No (attach details)

Others (give specific details)

3. **Contact Details.**

Postal Address:

City : _____ Province : _____

Country: _____ Pin/Zip Code : _____

Tele : _____ Fax : _____

URL/Web Site : _____

4. **Local Branch/Liaison Office/Authorised Representatives, in India (if any).**

Name & Address: _____

City : _____ Province : _____

Pin code : _____ Tel : _____ Fax : _____

5. **Financial Details.**

(a) Annual turnover: _____ USD

(b) Number of Employees in firm _____.

(c) Details of manufacturing infrastructure available

_____.

(d) Earlier contracts with Indian Ministry of Defence/Government agencies:

6. **Certification by Quality Assurance Organisation (If Applicable).**

Name of Agency

Certification Applicable from (date & year)

Valid till (date & year)

7. Equipment/Product Profile (to be submitted for each product separately)

- (a) Name of Product:
- (b) Description (attach technical literature):
- (c) Whether OEM or Integrator:
- (d) Status (in service /Design development stage):
- (e) Production capacity per annum:
- (f) Countries where equipment is in service:
- (g) Whether export clearance is required from respective Government:
- (h) Any collaboration/joint venture/co production/ authorised dealer with Indian Industry (give details):

Name & Address: _____
 Tel : _____ Fax : _____

- (j) Estimated price of the equipment

8. Alternatives for meeting the objectives of the equipment set forth in the RFI.

9. Any other relevant information.

Agency Contract
 Number
 Equipment Quantity Cost

10. **Declaration.** It is certified that the above information is true and any changes will be intimated within five (05) working days of occurrence.

(Authorised Signatory)