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Directorate General of
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General Staff Branch
Integrated HQ of Mod (Army)
Sena Bhawan, Room No-606
DHQ PO New Delhi - 110105

50078/LLLR(I)/GS/203/AAD-9

15 March 2023

(Vendors Concerned)

**GRANT OF EXTENSION FOR SUBMISSION OF EOI RESPONSE FOR
PROCUREMENT OF QUANTITY 16 LOW LEVEL LIGHT WEIGHT
RADAR (IMPROVED) UNDER MAKE II CATEGORY OF DAP 2020**

Dear Sir/Madam,

1. Refer Eol of Low Level Light Weight Radar (Improved) uploaded on DDP website (Make in India Projects) on 17 Jan 2023 and Pre Eol Response Meeting held on 28 Feb 2023.
2. As per **Para 27 of Eol**, the **Eol response submission date was 17 March 2023**. The last date of submission of Eol response has now been extended by the Competent Authority to **26 May 2023 (Ten Weeks)** instead of 17 March 2023.
3. The response to the Eol now, must be submitted on the day **26 May 2023**, between 0900 and 1700 hrs. A drop box will be placed at Sena Bhawan (Gate No 4) only on 26 May 2023 for all representatives of firms to physically deposit the EOI response document.




(Vikram Devgan)
Colonel
Member Secretary
For Chairman PFT

**INVITATION FOR EXPRESSION OF INTEREST (EOI) FOR PROCUREMENT OF
QUANTITY 16 LOW LEVEL LIGHT WEIGHT RADAR (IMPROVED)
UNDER MAKE II CATEGORY OF DAP-2020**

References : Defence Acquisition Procedure - 2020.

Appendices :

- Appendix A :** Preliminary Service Qualitative Requirements for Low Level Light Weight Radar (Improved).
- Appendix B :** Commercial Evaluation Criteria.
- Appendix C :** Technical Evaluation Criteria.
- Appendix D :** Correctness Certificate.
- Appendix E :** Confidentiality Agreement.
- Appendix F :** Eoi Compliance Certificate.
- Appendix G :** Information Performa.

1. **Introduction.** There is an operational requirement of Low Level Light Weight Radar (Improved) for providing warning to AD Wpns deployed in mountains and High Altitude Area (HAA) and the weapon mounted platforms operating in deserts. The adversary has a substantial capability to pose a formidable air threat in these areas. Low level actually provides a lucrative ingress level to an intruding aerial platform due to the paucity / absence / limitation of its adequate and effective coverage. Therefore to plug this critical vulnerability, there is an urgent need to procure improved version of Low Level Light Weight Radar (LLLR) for surveillance. Low Level Light Weight Radar (Improved) is proposed to be an Active Electronically Scanned Array (AESA) 3D radar which can provide low level surveillance of upto 50 Km and provide for tactical control of AD weapons. These radars can also be utilised to provide aerial surveillance to support mobile and mechanized operations.

2. **Objective.** The objective of this invitation of Expression of Interest (Eoi) is to seek responses from eligible Indian Vendors for the development of prototype and further procurement of Low Level Light Weight Radar (Improved).

3. **Layout.** The Eoi has been convened in following parts:-

- (a) Part I : General Information.

- (b) Part II : Scope of the Project.
- (c) Part III : Evaluation Criteria.
- (d) Part IV : Procedure for submission of response to the EoI.
- (e) Part V : Miscellaneous.

PART I : GENERAL INFORMATION

4. **Nomenclature.** Low Level Light Weight Radar (Improved).
5. **Categorisation.** The project is categorised as under:-
- (a) **Prototype Development Phase.** 'Make-II' in accordance with Para 5(b)(i) Chapter III of Defence Acquisition Procedure 2020.
 - (b) **Procurement Phase.** 'Buy (Indian-IDDMM)' with >50% indigenous content in accordance with Para 6 (d) of Chapter III of Defence Acquisition Procedure-2020.
6. **Quantity.**
- (a) **Prototype Development Phase.** The following equipment is required :-
- | Low Level Light Weight Radar (Improved) | Qty |
|--|------------|
| Low Level Light Weight Radar (Improved) | 01 (One) |
- (b) **Procurement Phase.** The following equipment is required :-
- | Low Level Light Weight Radar (Improved) | Qty |
|--|--------------|
| Low Level Light Weight Radar (Improved) | 16 (Sixteen) |
7. **Make II Procedure.** In accordance with at Chapter III of DAP-2020 and amendments thereof.

PART II : SCOPE OF THE PROJECT

8. **Scope.** Low Level Light Weight Radar (Improved) is required to provide low level surveillance cover to detect air threat along the Northern Borders (for deployment upto 5000 meters above Mean Sea Level) as well as to provide surveillance cover in support of mobile and mechanized operations in deserts.
9. **Preliminary Services Qualitative Requirements (PSQR) of the Proposed Low Level Light Weight Radar (Improved).** Extract of PSQR of the Low Level Light Weight Radar (Improved) is attached at Appendix A.

Timelines and Critical Activities

10. **Timelines & Milestones.** Tentative timelines for the project are given at as under :-

Ser No	Activity	Remarks	Timelines
(a)	Issue of Eol	By Project Facilitation Team (PFT)	T ₀
(b)	Eol Response Submission	By Eol respondents (Indian Vendors)	T ₀ + 8 weeks
(c)	Eol Response Evaluation	By Project Facilitation Team (PFT)	T ₀ + 8 to T ₀ + 14 weeks
(d)	Issue of Project Sanction Order	To selected DAs, meeting evaluation criteria	T ₀ + 14 to T ₀ + 16 weeks
(e)	Design and Development of Prototype	(i) Design & Development of prototype as per PSQR. (ii) Conduct of Prototype Readiness to ensure matching of prototype specification with PSQR as per Chapter III of DAP 2020 and amendments thereof. (iii) More than one review may be conducted, on requirement basis. Dates will be promulgated by the PFT, as per progress of the project.	T ₀ + 16 to T ₀ + 94 weeks
(f)	Trials, Conversion of PSQR to GSQR, Solicitation of Commercial offer and Contract	As per DAP 2020 and amendments thereof (As applicable).	-

Development of Prototype and Trials

11. All possible and reasonable assistance and any clarification related to functional or operational aspect of development as sought by DAs will be provided to respective DAs by Project Facilitation Team (PFT).

12. After the prototype has been developed as per PSQR given at **Appendix A**, the PFT would conduct Prototype Readiness as per Chapter III of DAP 2020 and amendments thereof (as applicable). Service HQ will formulate the 'Trial Directive' which will incorporate the parameters for validating the 'Essential Parameters'. Necessary technical literature pertaining to the design & material will be provided by the DAs for

conduct of Prototype Readiness to ensure matching of prototype specification with PSQR as per Chapter III of DAP 2020 and amendments thereof (as applicable).

Deliverables

13. The project is envisaged to have the following deliverables:-

(a) **Prototype Development Stage.** The following equipment is required :-

Low Level Light Weight Radar (Improved)	Qty
Low Level Light Weight Radar (Improved)	01(One)

(b) **Procurement Stage.** The following equipment is required :-

Low Level Light Weight Radar (Improved)	Qty
Low Level Light Weight Radar (Improved)	16 (Sixteen)

(c) **Warranty.** A warranty of 2 years will be required for the Low Level Light Weight Radar (Improved) system.

(d) **Maintenance Aspects.** Post warranty of 2 years, a suitable Engineering Support Package (ESP) comprising of MRLS (Two Years), Technical Literature, Special Maintenance Tools (SMTs), Special Test Equipment (STE), Test Jigs (TJs) and Fixtures and adequate training and training aggregates will be provided by the Seller.

Details of Trials / Assistance to be Provided

14. The following trials will be conducted / assistance will be provided :-

(a) **Trials.** As per relevant paras of Chapter III of DAP 2020 and amendments thereof (as applicable) a Single Stage Composite Trial will be carried out.

(b) **Assistance to be Provided.** Assistance to Vendor will be provided based on the merit of the request received by PFT. The vendor will be liable to bear the expenses of repair / replacement of the facility and all necessary insurance coverage in case of any damage occurring to equipment / property / personnel resulting from the testing of the job of vendor.

Solicitation of Commercial Offers

15. A commercial Request for Proposal (RFP) for 'Buy (Indian-IDDM)' phase would be issued to DA(s) as per DAP 2020 and amendments thereof (as applicable) for soliciting their commercial offers.

Multiple Technological Solutions

16. Multiple technologies solutions are not acceptable.

PART III : EVALUATION CRITERIA

Commercial Evaluation Criteria

17. Eol respondents will furnish their response to the Commercial Evaluation Criteria as per **Appendix B**.

18. **Technical Evaluation Criteria**. The respondents to this Eol are required to furnish information about their Technical Capability as per **Appendix 'C'**. 'Compliance/ information' is also required to be submitted as per the proposed solution offered by the DA against PSQR of Low Level Light Weight Radar (Improved).

19. **Indigenous Content (IC)**. Indigenous Content minimum 50% is to be achieved. Post successful development under Make-II would result in acquisition from successful DAs through 'Buy (Indian-IDDM)' category with indigenous design and development. The Indigenous Content \geq 50% in accordance to Para 21, Chapter I of DAP 2020.

20. **Additional Information**. Additional information required to be furnished as part of the Eol response is given at **Appendix G**.

21. **Foreign Collaboration**. If the Eol Respondent is collaborating / plans to collaborate with a foreign technology provider, the nature of such collaboration and the technology areas being transferred must be stated in the response (**Please refer Para 16 of Appendix G**).

22. **Rejection Criteria for Selection as DAs**. The following may lead to rejection of Eol response :-

- (a) Failure to meet Commercial Evaluation Criteria given at **Appendix B**.
- (b) Failure to offer meet / comply with Technical Evaluation Criteria given at **Appendix C**.
- (c) Failure to submit certificates as mentioned at **Appendices D to F** of the Eol.
- (d) Failure to offer compliance to any of the terms and conditions given in the Eol.
- (e) Any other parameter of the response considered inadequate by the MoD, Government of India.

PART IV : PROCEDURE FOR SUBMISSION OF RESPONSE TO THE Eol

23. The response to the Eol shall be submitted as per formats given at **Appendices B to G**.

24. **Guidelines for Submitting Eol Responses.**

(a) The responses should be submitted strictly as per the formats given in respective Appendices. The vendors will submit their response on **Appendices B to F**. The response will be marked by pen on a printout of **Appendices B to F**. Any additional info may be entered by pen in remarks column. Additional information as per **Appendix G** will be submitted separately as per the given format.

(b) All responses and Appendices should be submitted in a single file / folder. Supporting documents / additional references should be submitted in a separate folder with proper reference mentioned against each parameter / sub parameter in respective appendices.

(c) Any supporting document / evidence without any reference to specific parameter of criteria will not form part of the assessment.

25. The Eol respondent shall submit three (03) copies of response to the Eol, clearly marking one copy as '**Original Copy**' and **second & third as 'Duplicate Copy and Triplicate Copy'**. The response will be submitted on print out of **Appendices B to F** uploaded alongwith the Eol. In the event of any discrepancy between them, the original copy shall govern/ prevail. Each page of the response will bear the signatures of the authorised signatory of the company. The DA shall also submit a soft copy of the response to this Eol in a CD/ DVD.

26. **The Envelopes will be Addressed as under :-**

Secretary, Project Facilitation Team
Army Air Defence Directorate/AAD-9
Integrated HQ of MoD (Army)
Room No 608, D1 Wing, Sena Bhawan
DHQ PO, New Delhi – 110011
Tele No : 33884

27. The responses to this Eol must be submitted on the day **17 Mar 2023, between 0900 hrs and 1700 hrs. A drop box will be placed at Sena Bhawan (Gate No 4) only on 17 Mar 2023 for all representatives of firms to physically deposit the EOI response document. The soft copy of response documents is required in MS Word only.**

28. **Confidentiality Agreement.** The Company will be required to sign and honour the 'Confidentiality Agreement' with MoD Govt of India. The 'Confidentiality Agreement' will be furnished by each Eol respondent at the time of submission of Eol responses as per format given at **Appendix E**.

PART V : MISCELLANEOUS

29. **Pre Eol Responses Meeting** A pre-response meeting will be held on **28 Feb 2023 at 1030 hrs** at Directorate General of Army AD, AAD-9 (TCR & Make), New

Delhi-110011. Vendors are required to submit their queries / clarifications / amplifications in writing to this office by **13 Feb 2023**.

30. Guidelines for penalties in business dealings with entities as promulgated by Government from time to time, will be applicable on procurement process & bidders.

31. The Pre-Contract Integrity Pact (PCIP), listed as detailed in Paragraph 119 of Chapter II of DAP-2020, shall apply mutatis mutandis to the 'Buy (Indian-IDDMM)' phase of 'Make' project.

32. Respondent would be subject to disqualifications if they make false, incorrect, or misleading claims in their response to this EoI. A 'Correctness Certificate' as per the format at **Appendix D** will be furnished as part of the response.

33. An EoI Compliance Certificate will be submitted as per **Appendix F**.

34. Please acknowledge the receipt of this invitation for EoI.

File No :50078/MAKE/LLLR(I)/GS/AAD-9

Dated : **16** Jan 2023

Enclosures : Appendices A to G

(Vikram Devgan) *col*

Colonel

Secretary, Project Facilitation Team
Low Level Light Weight Radar (Improved)

DG AAD (AAD-9)

PRELIMINARY STAFF QUALITATIVE REQUIREMENTS FOR
LOW LEVEL LIGHT WEIGHT RADAR (IMPROVED)

Introduction and Proposed Employment of the System

1. **Introduction.** There is an operational requirement of Low Level Light Weight Radar (Improved) for deploying primarily in mountains and High Altitude Area (HAA) along the Northern Borders as the low level aerial surveillance in these areas are restricted due to the terrain configuration. These radars will also be required to provide aerial surveillance in support of mobile and mechanized operations and also in coastal regions.
2. **Aim.** The aim of this PSQR is to lay down the qualitative requirement for the Low Level Light Weight Radar (Improved).

ESSENTIAL PARAMETERS

Operational Parameters

3. The Low Level Light Weight Radar (Improved) system shall consist of the following components :-
 - (a) Search radar.
 - (b) Commanders Display Unit (CDU).
 - (c) Target Designation System (TDS).
 - (d) Power Supply Unit.
4. **System Visualization.**
 - (a) A Low Level Light Weight Radar (Improved) system is visualized to comprise of a three dimensional (3D) Active Electronically Scanned Array (AESA) technology search antenna, Commanders Display Unit (CDU), Target Designation System(TDS), and integral power supply system. The equipment must be light weight and manportable with efficient ECCM capability.
 - (b) **Technology.** Three dimensional (3D) Active Electronically Scanned Array (AESA) technology search antenna based on GaN T/R Modules with digital beam forming.
5. The Low Level Light Weight Radar (Improved) system should have the flexibility in employment and deployment to provide Air Defence support to Vulnerable Area/ Vulnerable Point (VA / VP). The Low Level Light Weight Radar (Improved) system should have the following operational parameters / capabilities :-

<u>Ser No</u>	<u>Parameter</u>	<u>Requirement</u>
<u>Performance Characteristics</u>		
(a)	Terrain	Suitable of being deployed and operated in mountains, High Altitude Area (HAA), plains, semi deserts, deserts and coastal regions.
(b)	Target tracking capability	>100 targets
(c)	Target Designation	Capability to designate minimum 20 tracks simultaneously to minimum 10 command posts or 10 weapon systems each having Target Data Receivers (TDRs) up to a distance of 20 Km from the radar, using line, and radio / Radio Relay and should be scalable upto 20 x TDRs.
(d)	ECCM Facilities	(i) Facilities to detect, depict & work through both active and passive jamming. (ii) Facilities to counter deception jamming in range, azimuth and velocity. (iii) Side lobe cancellation /Ultra Low Side Lobes/ Side Lobe cancellation. (iv) Random PRF and frequency hopping. (v) Facility for sector blanking & sector transmission.
(e)	Operation Temperature Range	(i) <u>Minimum Temperature.</u> Between minus 20°C and minus 10°C. (ii) <u>Maximum Temperature.</u> Between 40°C and 45°C.
(f)	Integration with AKASHTEER	Radar should be compatible for integration with Akashteer C & R module with one way exchange of data.
(g)	Software	Equipment should operate on propriety software.
(h)	Own Location and North Orientation	Radar should have auto alignment capability through (NavIC/ GPS /GLONASS) indicating north and own location (10 figure GR).
(j)	Recording	Radar should be capable of recording minimum four hours of computer activities. All data should be recorded with a time tag. The recorded data should be capable of being down loaded to an external debriefing system (Laptop / PC Computer) for generation of the required debriefing reports.

<u>Physical Characteristics</u>		
(k)	Transportability	Low Level Light Weight Radar (Improved) system must be manportable and transportable by 'In Service' Load Carrying vehicles, by rail, aircraft and underslung by helicopter.
(l)	Weight	<u>Maximum Weight of Radar System.</u> Weight of radar system (unpacked) < 175 Kgs (Excluding power supply unit).
(m)	Operating Altitude of Radar	5000 m above Mean Sea Level.
(n)	Time to bring equipment into action	Not more than 10 minutes.

6. **Individual Component Requirements.** The main components of the Low Level Light Weight Radar (Improved) are as under :-

(a) **Search Radar.** Search radar of the **Low Level Light Weight Radar (Improved)** should provide continuous 3D surveillance of friendly and hostile aerial targets in the area of responsibility. The radar should comprise of a three dimensional (3D) Active Electronically Scanned Array (AESA) technology search antenna based on GaN T/R Modules with digital beam forming. It should be able to detect all types of aerial targets up to 50 Kms with a wide beam coverage in elevation.

(b) **Commanders Display Unit (CDU).** CDU must provide full remote control of the radar modes, display, provide real time information about the system's status applying user friendly Graphic User Interface(GUI) and can be deployed upto 50 meters from the radar. The display should have a georef /grid lat-long overlay and should be compatible with Defence Series Maps.

(c) **Target Designation System.**

(i) A suitable target designation system should be available which is capable of passing target data to minimum 10 command posts or 10 weapon systems through Target Data Receiver (TDR) up to a distance of 20 Km from the radar, using line, and radio / Radio Relay with suitable display system. TDRs must be based on rechargeable batteries with suitable charging sets.

(ii) Facility must exist to apply parallax correction to the target data automatically. The position determining equipment should be based on IRNSS / GPS /GLONASS available in the TDR.

(iii) TDR should display the target attributes of minimum four priority targets after parallax correction in prioritized sequence based on threat. Prioritisation should be based on the target speed, its location and heading with respect to the TDR.

(iv) For Threat Neutralization the Target Data Receiver should have interface port to provide target cue to Weapon System.

(v) Audible / visual alert should be available in TDR on the appearance of 1st target with provision to reset the alert.

(d) **Power Supply Unit.**

(i) Adequate power supply with backup for uninterrupted operation of the radar. The endurance of each power supply unit should not be less than 8 hours without refueling.

(ii) The generator should be compliant to the latest Central Pollution Control Board (CPCB) norms.

(iii) Facility should also be provided to operate it from commercial power supply.

(iv) UPS should be provided as a power back up of not less than 20 minutes for operation of system computers / display console to ensure that the data is not lost and batteries should be commercially available.

(v) Maximum weight of generator should be less than 50 Kg.

Technical Parameters

7. The Low Level Light Weight Radar (Improved) should have the following technical parameters/ capabilities :-

<u>Ser No</u>	<u>Parameter</u>	<u>Requirement</u>
(a)	Capable of detecting and providing 3D data of aerial objects of specification at ranges	(i) RCS of 2 sqm target - Upto 50 Km (ii) RCS of 0.1 m ² or more - Upto 18 Km (iii) RCS of 0.001 m ² or more - Upto 4 Km
(b)	Minimum Detection Ranges	200 m or less
(c)	Elevation Coverage	≥ 70 ⁰ (incl negative elevation coverage upto -5 ⁰)
(d)	Bearing Coverage	360 ⁰
(e)	Range Accuracy	≤ 50 m
(f)	Azimuth Accuracy	≤ 0.5 ⁰
(g)	Elevation Accuracy	600 m at max range
(h)	Speed of Target	Upto 850 m/s (Vendor certification for speeds exceeding 300 m/s) and should also be capable

		of detecting hovering aerial objects.
(j)	Tgt Update Rate.	< 2 sec
(k)	Target Detection Altitudes	Upto 10,000 meters

Maintenance and Ergonomic Parameters

8. **Maintainability Requirements.**

- (a) Test Equipment (BITE)/Power On Self - Test (POST).
- (b) Protection to prevent reverse polarity fitment for all PCBs/Cards/Cables/Batteries.

9. **Testing Parameters.** To be decided at the time of formulation of Acceptance Test Procedure (ATP).

Miscellaneous.

- 10. **EMI / EMC.** Compatibility to MIL STD 461 E/F.
- 11. **Identification Friend or Foe (IFF).** It should be fitted with in service IFF Mk XII(S)/ (A) or latest IFF version available at the time of procurement trials.
- 12. **Storage.** Weight of radar packed with rugged hard cases < 300 Kgs (excluding power supply unit).
- 13. **Service Life.** The Radar should have a service life of 15 yrs or more (Vendor certification).
- 14. **Protection Against Lightning.** The system should be provided protection against lightning.

DESIRABLE PARAMETER

Nil

- 15. **Conclusion.** No departure shall be made from this qualitative requirement without the prior authority, in writing, of the GSEPC.
- 16. **Review.** The PSQR may be reviewed by user, if required, to cater for operational requirement and technological improvement / up-gradation.

Details of Drafting Team

Prepared By	: Col Samudra Vijay Sarma, Col AD (TCR & Make)
Verified By	: Brig OP Vaishnav, SM,VSM Brig AD (Acqn & Sustenance)
Address	: DG AAD/ AAD-9, Room No 608, D-1 Wing, Sena Bhawan
Contact Details	: 34884

RESTRICTED

Appendix B
(Refers to Para 17 of Eol)

COMMERCIAL EVALUATION CRITERIA

Evaluation Criteria

1. Name of the Vendor
2. Evaluation Criteria

<u>S No</u>	<u>Criteria</u>	<u>Vendor Submission</u>	<u>Remarks (if Any)</u>
(a)	Nature of the Company (refer Para 6 (b) of Chapter III of DAP-2020).	Indian / Joint Venture	Supporting Documents to be attached.
(b)	Ownership status (refer Para 6(b) of Chapter III of DAP-2020).	Compliant / Non-compliant	-do-
(c)	Category of Industry.	Large / Medium / Small / Micro / Start Up / Others	-do-
(d)	Registration Details (as applicable for; <i>MSMEs - Udyam Registration Certificate, Start Ups - DPIIT Certificate and Others - Registration Certificate (as applicable)</i>).	Yes / No	-do-
(e)	Minimum average turnover for last three financial years from date of issue of Eol (5% of AoN Cost).	Average more than ___ Cr / less than _____ Cr	-do-
(f)	Net worth of previous financial year ending 31 Mar 2022.	Positive / Negative	-do-
(g)	Defence Industrial License details.	Yes / Applied for / Being applied for	-do-

Station :

Signature

Company Seal

Date :

Note :

1. All submissions must be on printed copy of Appendix as uploaded on MoD website and should be supported by referenced documents duly authenticated.
2. Any input with incorrect or missing reference will not assessed.

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TECHNICAL EVALUATION CRITERIA

<u>S No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>
1.	Indigenous content will be minimum 50% as per DAP-2020	Compliant/ Non Compliant	
2.	Indigenous design as per provision of DAP-2020	Compliant/ Non Compliant	
3.	<u>Timelines.</u>		
	(a) Development of prototype - 78 weeks	Compliant/ Non Compliant	
	(b) Delivery of complete items as per delivery schedule - 24 Months.	Compliant/ Non Compliant	
4.	Confirmation of capability to develop and provide equipment to meet user requirements specified in <u>Appendix A</u> (PSQR).	Compliant/ Non Compliant	
5.	Proposed system configuration (broad design details).	Provided/ Non Provided	
6.	<u>Nature of Business.</u> Manufacturing entity or System Integrator of defence equipment and not a trading company.	Compliant/ Non Compliant	
7.	<u>Experience .</u> Min 02 Yrs, experience in broad areas like manufacturing /electronics/radar modules/radar components /radar etc, as applicable in the instant case (Details to be provided with the response). If not, than cumulative experience of at least 03 years in above areas, resulting in gaining of competence for manufacturing the proposed product (Details of Existing manufacture related infrastructure /R&D/Quality control facilities to be provided).	Compliant/ Non Compliant	

<u>S No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>
<u>Essential Parameters</u>			
<u>Introduction and Proposed Employment of the System</u>			
8.	<u>Introduction.</u> There is an operational requirement of Low Level Light Weight Radar (Improved) for deploying primarily in mountains and High Altitude Area (HAA) along the Northern Borders as the low level aerial surveillance in these areas are restricted due to the terrain configuration. These radars will also be required to provide aerial surveillance in support of mobile and mechanized operations and also in coastal regions.	Compliant/ Non Compliant	
9.	<u>Aim.</u> The aim of this PSQR is to lay down the qualitative requirements for the Low Level Light Weight Radar (Improved).	Compliant/ Non Compliant	
<u>Operational Parameters</u>			
10.	The Low Level Light Weight Radar (Improved) system shall consist of the following components :-		
(a)	Search radar.	Compliant/ Non Compliant	
(b)	Commanders Display Unit (CDU).	Compliant/ Non Compliant	
(c)	Target Designation System (TDS)	Compliant/ Non Compliant	
(d)	Power Supply Unit	Compliant/ Non Compliant	

<u>S No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>
11.	<u>System Visualization.</u> A Low Level Light Weight Radar (Improved) system is visualized to comprise of a three dimensional (3D) Active Electronically Scanned Array (AESA) technology search antenna, Commanders Display Unit (CDU), Target Designation System(TDS), and integral power supply system. The equipment must be light weight and manportable with efficient ECCM capability.	Compliant/ Non Compliant	
12.	<u>Technology.</u> Three dimensional (3D) Active Electronically Scanned Array (AESA) technology search antenna based on GaN T/R Modules with digital beam forming.	Compliant/ Non Compliant	
13.	The Low Level Light Weight Radar (Improved) system should have the flexibility in employment and deployment to provide Air Defence support to Vulnerable Area/ Vulnerable Point (VA / VP).	Compliant/ Non Compliant	
14.	The Low Level Light Weight Radar (Improved) should have the following operational parameters / capabilities :-		
<u>Performance Characteristics</u>			
15.	(a) <u>Terrain</u> Suitable of being deployed and operated in mountains, High Altitude Area (HAA), plains, semi deserts, deserts and coastal regions	Compliant/ Non Compliant	

<u>S No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>
	(b) <u>Target tracking capability</u> >100 targets	Compliant/ Non Compliant	
	(c) <u>Target Designation</u> Capability to designate minimum 20 tracks simultaneously to minimum 10 command posts or 10 weapon systems each having Target Data Receivers (TDRs) up to a distance of 20 Km from the radar, using line, and radio / Radio Relay and should be scalable upto 20 x TDRs.	Compliant/ Non Compliant	
	(d) <u>ECCM Facilities</u> (i) Facilities to detect, depict & work through both active and passive jamming. (ii) Facilities to counter deception jamming in range, azimuth and velocity. (iii) Side lobe cancellation /Ultra Low Side Lobes/ Side Lobe cancellation. (iv) Random PRF and frequency hopping. (v) Facility for sector blanking & sector transmission.	Compliant/ Non Compliant Compliant/ Non Compliant Compliant/ Non Compliant Compliant/ Non Compliant Compliant/ Non Compliant	

<u>S No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>
	(e) <u>Operation Temperature</u> (i) <u>Minimum Temperature.</u> Between minus 20°C and minus 10°C. (ii) <u>Maximum Temperature.</u> Between 40°C and 45°C.	Compliant/ Non Compliant Compliant/ Non Compliant	
	(f) <u>Integration with AKASHTEER</u> Radar should be compatible for integration with Akashteer C & R module with two way exchange of data.	Compliant/ Non Compliant	
	(g) <u>Software</u> Equipment should operate on propriety software.	Compliant/ Non Compliant	
	(h) <u>Own Location and North Orientation</u> Radar should have auto alignment capability through (IRNSS/ GPS /GLONASS) indicating north and own location(10 figure GR).	Compliant/ Non Compliant	
	(j) <u>Recording</u> Radar should be capable of recording minimum four hours of computer activities. All data should be recorded with a time tag. The recorded data should be capable of being down loaded to an external debriefing system (Laptop/ PC Computer) for generation of the required debriefing reports.	Compliant/ Non Compliant	

<u>S No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>
	(k) <u>Physical Characteristics</u> The Low Level Light Weight Radar (Improved) system should have the flexibility in employment and deployment to provide Air Defence support to Vulnerable Area/ Vulnerable Point (VA / VP).	Compliant/ Non Compliant	
	(l) <u>Transportability</u> Low Level Light Weight Radar (Improved) system must be manportable and transportable by 'In Service' Load Carrying vehicles, by rail, aircraft and underslung by helicopter.	Compliant/ Non Compliant	
	(m) <u>Weight</u> <u>Maximum Weight of Radar System.</u> Weight of radar system {unpacked < 175 Kgs(Excluding power supply unit)}	Compliant/ Non Compliant	
	(n) <u>Operating Altitude of Radar</u> 5000m above <u>Mean Sea Level</u>	Compliant/ Non Compliant	
	(o) <u>Time to bring equipment into action</u> Not more than 10 minutes	Compliant/ Non Compliant	
<u>Individual Component Requirements.</u>			
16.	The main components of the Low Level Light Weight Radar (Improved) are as under :-		

<u>S No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>
	<p>(i) <u>Search Radar.</u> Search radar of the Low Level Light Weight Radar (Improved) should provide continuous 3D surveillance of friendly and hostile aerial targets in the area of responsibility. The radar should comprise of a three dimensional (3D) Active Electronically Scanned Array (AESA) technology search antenna based on GaN T/R Modules with digital beam forming. It should be able to detect all types of aerial targets up to 50 Kms with a wide beam coverage in elevation.</p>	Compliant/ Non Compliant	
	<p>(ii) <u>Commanders Display Unit (CDU).</u> CDU must provide full remote control of the radar modes, display, provide real time information about the system's status applying user friendly Graphic User Interface(GUI) and can be deployed upto 50 meters from the radar. The display should have a georef /grid lat – long overlay and should be compatible with Defence Series Maps.</p>	Compliant/ Non Compliant	

<u>S No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>
	<p>(iii) <u>Target Designation System.</u></p> <p>(aa) A suitable target designation system should be available which is capable of passing target data to minimum 10 command posts or 10 weapon systems through Target Data Receiver (TDR) up to a distance of 20 Km from the radar, using line, and radio / Radio Relay with suitable display system. TDRs must be based on rechargeable batteries with suitable charging sets.</p> <p>(ab) Facility must exist to apply parallax correction to the target data automatically. The position determining equipment should be based on IRNSS / GPS /GLONASS available in the TDR.</p>	<p>Compliant/ Non Compliant</p> <p>Compliant/ Non Compliant</p>	

<u>S No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>
	<p>(ac) TDR should display the target attributes of minimum four priority targets after parallax correction in prioritized sequence based on threat. Prioritisation should be based on the target speed, its location and heading with respect to the TDR.</p> <p>(ad) For Threat Neutralization the Target Data Receiver should have interface port to provide target cue to Weapon System.</p> <p>(ae) Audible / visual alert should be available in TDR on the appearance of 1st target with provision to reset the alert.</p>	<p>Compliant/ Non Compliant</p> <p>Compliant/ Non Compliant</p> <p>Compliant/ Non Compliant</p>	

<u>S No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>
	<p>(iv) <u>Power Supply Unit.</u></p> <p>(aa) Adequate power supply with backup for uninterrupted operation of the radar. The endurance of each power supply unit should not be less than 8 hours without refueling.</p> <p>(ab) The generator should be compliant to the latest Central Pollution Control Board (CPCB) norms.</p> <p>(ac) Facility should also be provided to operate it from commercial power supply.</p> <p>(ad) UPS should be provided as a power back up of not less than 20 minutes for operation of system computers / display console to ensure that the data is not lost and batteries should be commercially available.</p> <p>(ae) Maximum weight of generator should be less than 50 Kg.</p>	<p>Compliant/ Non Compliant</p> <p>Compliant/ Non Compliant</p> <p>Compliant/ Non Compliant</p> <p>Compliant/ Non Compliant</p> <p>Compliant/ Non Compliant</p>	

<u>S No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>
	<u>Technical Parameters.</u>		
17.	The Low Level Light Weight Radar (Improved) system should be able to transmit target coordinates to minimum 10 command posts or 10 weapon systems and exercise tactical control on them. The radar should have the following technical parameters/ capabilities :-	Compliant/ Non Compliant	
	(a) Capable of detecting and providing 3D data of aerial objects of specification at ranges (i) RCS of 2 sqm target - Upto 50 Km (ii) RCS of 0.1 m ² or more - Upto 18 Km (iii) RCS of 0.001 m ² or more - Upto 4 Km	Compliant/ Non Compliant	
	(b) <u>Minimum Detection Ranges</u> 200m or less	Compliant/ Non Compliant	
	(c) <u>Elevation Coverage</u> $\geq 70^{\circ}$ (incl negative elevation coverage upto -5°)	Compliant/ Non Compliant	
	(d) <u>Bearing Coverage</u> 360°	Compliant/ Non Compliant	
	(e) <u>Range Accuracy</u> $\leq 50m$	Compliant/ Non Compliant	
	(f) <u>Azimuth Accuracy</u> $\leq 0.5^{\circ}$	Compliant/ Non Compliant	
	(g) <u>Elevation Accuracy</u> 600m at max range	Compliant/ Non Compliant	

<u>S No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>
	(h) <u>Speed of Target.</u> Upto 850 m/s (Vendor certification for speeds exceeding 300m/s) and should also be capable of detecting hovering aerial objects.	Compliant/ Non Compliant	
	(j) <u>Tgt Update Rate</u> ≤ 2 sec	Compliant/ Non Compliant	
	(h) <u>Target Detection Altitudes</u> Upto 10,000 meters	Compliant/ Non Compliant	
	<u>Maintenance and Ergonomic Parameters</u>		
18.	<u>Maintainability Requirements.</u> (i) Test Equipment (BITE)/Power On Self - Test (POST). (ii) Protection to prevent reverse polarity fitment for all PCBs/Cards/Cables/ Batteries.	Compliant/ Non Compliant Compliant/ Non Compliant	
19.	<u>Testing Parameters</u> To be decided at the time of formulation of Acceptance Test Procedure (ATP)	Compliant/ Non Compliant	
	<u>Miscellaneous.</u>		
20.	<u>EMI / EMC.</u> Compatibility to MIL STD 461 E/F	Compliant/ Non Compliant	

<u>S No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>
21.	(c) <u>Identification Friend or Foe (IFF)</u> . It should be fitted with in service IFF Mk XII(S)/ (A) or latest IFF version available at the time of procurement trials.	Compliant/ Non Compliant	
22.	(d) <u>Storage</u> . Weight of radar packed with rugged hard cases < 300 Kgs (excluding power supply unit).	Compliant/ Non Compliant	
23.	(e) <u>Service Life</u> . The Radar should have a service life of 15 yrs or more (Vendor certification).	Compliant/ Non Compliant	
24.	(f) <u>Protection Against Lightning</u> . The system should be provided protection against lightning.	Compliant/ Non Compliant	

25. **Compliance Certificates**.

- (a) Correctness Certificate (As per Appendix D) : Compliant / Non Compliant.
- (b) Confidentiality Agreement (As per Appendix E) : Compliant / Non Compliant.
- (c) EoI Compliance Certificate (As per Appendix F) : Compliant / Non Compliant.

Station:

Date :

Signature

Company Seal

Note :

1. All submissions must be on printed copy of Appendix as uploaded on MoD website and should be supported by referenced documents duly authenticated.
2. Any input with incorrect or missing reference will not assessed.

RESTRICTED

Appendix D

(Refers to Para 32 of EoI)

CORRECTNESS CERTIFICATE

It is certified that information submitted in the documents as part of the response to Expression of Interest for the project of The Low Level Light Weight Radar (Improved) is correct and complete in all respects. It is acknowledged that the company will be disqualified from further participation if any information provided is found to be incorrect.

Signature with Company Seal

Note :

1. All submissions must be on printed copy of Appendix as uploaded on MoD website and should be supported by referenced documents duly authenticated.
2. Any input with incorrect or missing reference will not assessed.

RESTRICTED

Appendix E

(Refers to Para 28 of Eol)

CONFIDENTIALITY AGREEMENT

1. It is certified that Expression of Interest document for the project The Low Level Light Weight Radar (Improved) will not be shared with any agency in part or full any other agency. Only relevant details, as applicable, will be shared with technology partners including foreign technology partners. However, the Eol document itself will not be shared with any technology partners.
2. The company understands the security sensitivity of such an operational systems and any information pertaining to deployment and usage of the system including system scaling will not be discussed with third party without a written permission from the Project Facilitation Team. The company understands that failure to observe this agreement will lead to disqualification from the project.

Signature with Company Seal

Note :

1. All submissions must be on printed copy of Appendix as uploaded on MoD website and should be supported by referenced documents duly authenticated.
2. Any input with incorrect or missing reference will not assessed.

Appendix F

(Refers to Para 33 of Eol)

Eoi COMPLIANCE CERTIFICATE

It is certified that all the aspects mentioned in the Expression of Interest for the procurement of The Low Level Light Weight Radar (Improved) are being complied to. It is acknowledged that the company will be disqualified from further participation if any aspect mentioned in Expression of Interest is not complied with.

Signature with Company Seal

Note :

1. All submissions must be on printed copy of Appendix as uploaded on MoD website and should be supported by referenced documents duly authenticated.
2. Any input with incorrect or missing reference will not assessed.

Appendix G

(Refers to Para 20 of EoI)

INFORMATION PERFORMA

1. Name of the Company.
2. Name of CEO with Designation.
3. Address of the Registered Office.
4. Address of the Factory / Factories.
5. Company Website(s).
6. Date of Incorporation.
7. Brief History of the Company.
8. Category of Industry (Large / Medium / Small / Micro).
9. Nature of Company (Public Limited/ Private Limited).
10. **General Information of Company.**
 - (a) CIN
 - (b) Shareholding pattern.
 - (c) Details of ISO, Quality Assurance and other Certification.
11. **Financial Information:-**
 - (a) Revenue and Net Profit during the last three Financial Years.
 - (b) Present Net Worth of the Company.
 - (c) Credit Rating/*s from RBI/SEBI approved agencies.
12. Nature of Business (Manufacture / Trader / Sole selling or Authorised Agent/ Dealer / Assembler / Processor / Re packer/ Service Provider). Please give broad product range as applicable
13. Details of Current Products :-
 - (a) Type / Description.
 - (b) Licensed / Installed Capacity.
 - (c) Annual Production for Preceding 3 Years.

14. Credit Rating.
15. Details of IPRs if any.
16. Details of Foreign Collaborations if any planned for execution of project.
17. Technology Received from abroad and assimilated / planned for execution of project.
18. Products Already Supplied :-
 - (a) To Indian Army / Air Force / Navy.
 - (b) PSUs.
 - (c) DRDO and its Laboratories.
 - (d) Ordnance Factories.
 - (e) Any other Defence Organisation.
 - (f) To other Principal Customers.
19. Details of Developmental Facilities :-
 - (a) R&D Facilities Available.
 - (b) Number of Technical Manpower.
 - (c) Percentage of Total Turn-Over Spent on R&D during the Last Three Years.
20. Turn-Over during the last Three financial Years.
21. Any other relevant information.
22. Contact Details of the Executive nominated to co-ordinate with the Assessment Team (Please provide telephone, mobile and e-mail address).

Station:

Signature

Company Seal

Date :