BRIEF OF PROJECT: MULTIMODE MULTIFUNCTION WEAPON LOCATING RADAR

1. **Name of Proposal**. Multimode Multifunction Weapon Locating Radar (WLR) to be known as MM LR.

2. **User Directorate in SHQ**. DG Arty/ Arty-9.

3. **Brief Description**.

3.1. Active Electronic Scanned Array Technology.

3.2. Radar and Power Source on one vehicle.

3.3. Deploying and closing time less than 5 minutes.

3.4. Capability to detect enemy aerial, ground and Artillery targets.

3.5. Capability to detect all threats simultaneously.

3.6. Anti ECM capability.

3.7. Counter Unmanned Aerial System (C-UAS) measures incorporated.

3.8. Wireless communication with surveillance centres maintaining data immunity and integrity.

4. **Operation Justification**. Future battlefield will pose a wide range of threats possessing high maneuverability and fast deployment capability. Indian Artillery is currently holding separate radars for detecting various types of threats. BFSR are deployed for detecting limited aerial threat (helicopter) & ground threats (troops, vehicles & tanks) and WLRs detect enemy Mortars/ Guns/ Rockets. As separate equipment in limited numbers are held for detection of these targets, operational voids are created. To mitigate these challenges, radars with a capability of performing multi-missions, multifunctions in multiple modes are required. Weapon Locating Radars which have the capability to be operated with Active Electronic Scanned Array based technology can detect aerial, ground and Artillery weapons simultaneously as required in future battle field operations. These radars also have the flexibility to operate effectively in Mountains and Plains with very less deployment and redeployment timings to mitigate counter bombardment and aerial attacks. Such radars enhance the ISR and degradation capability of Indian Army.

5. **Indigenous Content**. 50%, Para 21 of Chapter I of DAP 2020.

6. **Additional Information**. Equipment to have following additional capabilities: -

6.1. Wireless transmission of info to surveillance centres/ hubs.

6.2. GPS, GLONASS & IRNSS (RS) enabled.

6.3. DSM compatibility.

6.4. Capable to track aerial, ground & artillery targets simultaneously.

6.5. Capability for carrying out Direction of Own Artillery Fire (DOAF).

Appx-A

QUESTIONNAIRE FOR UNDERTAKING PROJECT FOR MULTIMODE MULTIFUNCTIONAL WEAPON LOCATING RDR (MMWLR) UNDER THE 'MAKE CATEGORY' OF DEFENCE ACQUISITION PROCEDURE (DAP)-2020

General Specification

1. What is the general configuration of the MMWLR system? List the components of the system.

2. Can the MMWLR system operate in plains, desert, jungles, hilly terrain and high altitude area in climatic conditions extant in India and what are the mobility parameters including gradient restrictions?

3. Is the MMWLR system modular in design and capable of repair in field?

4. What is the total weight of MMWLR mounted on vehicle?

5. What is the turning radius of radar vehicle?

6. What would be the service life of the MMWLR system? Specify in number of years?

7. How many years of product support and provision of spares and maintenance assistance will be provided?

8. Will the system undergo hardware and software upgrades during service life, if so, at what frequency? Are any upgrades of the systems planned, if so, the details of upgrades and schedule be provided?

9. How many crew members are required to setup and operate of MMWLR?

10. Is the entire system ruggedized as per military standards 810 G and able to operate in terrain and environmental conditions prevalent in India?

Technical Specifications of the MMWLR

11. Give out in brief the description of the system?

12. What is the material used in manufacture of the MMWLR?

13. What are the indications to an operator about enemy aerial, ground and Artillery targets.

14. How does the radar discriminate among the following?

14.1 Ground, Aerial and Hostile activity.

14.2 Speed and Size of aerial targets.

14.3 Calculation of various Arty shells/ projectiles.

14.4 Single fire & Volley fire.

14.5 Echoes from unwanted targets (Ballistic and non-ballistic).

14.6 High and low muzzle velocity.

15. How many projectiles, ground and aerial targets can the equipment track simultaneously while scanning the maximum search sector?

16. What are the crest clearance problems for the radar?

17. Can the system detect low angle long range arty fire effectively?

18. What is the time taken for detection and transmission?

19. What is the detection technology employed by the MMWLR and how is active technology obsolescence being managed?

20. What all active and passive survivability and protection measures have been incorporated in the radar for threats against enemy UAS, jammers, radiation seekers?

21. What types of ECCM features would the radar have to operate in hostile environment?

22. What is the maximum operating altitude where the MMWLR can be deployed?

23. What are the detection ranges for

23.1 Rockets, Missiles and Artillery shells.

23.2 Fighters.

23.3 Helicopters.

23.4. UAS.

23.5 Light vehicles, B vehicles and A vehicles.

24. Can the data of hostile location/ movement be transferred to external port?

25. How many targets can the MMWLR locate, track and acquire simultaneously in a high density fire environment?

26. Would the radar be able to simultaneous track Arty, UAS etc?

27. Would the radar be able to provide data in desired format to be passed on to the Army Network for analysis?

28. Would the radar be able to ingest Artificial Intelligence for providing various types of assistance to user to include Data Management, Change Detection, Duplicate Rejection etc?

29. What type of slew system would be incorporated in the radar?

30. What will be the counter electronic warfare arrangements, technology and system in radar?

31. What frequency would the radar operate on for detection of various types of targets?

32. What would be the approximate dimension of the radar?

33. What would be the transportability means of shifting the radar to distant locations?

Operational Specifications of the MMWLR

34. Are there any special requirements for friendly fire mode?

35. Give out the maximum ranges at which DOOAF can be carried out with following equipment:-

35.1 Mortars of caliber 80mm or larger

35.2 Guns/ howitzers of caliber 100 mm or larger

35.3 Free flight rockets

36. How many friendly fire missions can be generated and executed simultaneously?

37. What are the accuracies achieved in friendly fire mode?

38. Can the system work in Hostile mode and Friendly fire mode simultaneously?

39. Can the radar direct fire of more than one gun on a target?

40. Are simulators for training of the crew available and is it a part of the system being offered or is to be procured separately?

41. Is the radar compatible with DSM?

42. What all types of maps would be compatible in MMWLR?

43. Can the satellite based imageries including SAR imagery be incorporated in the system for assimilating targets?

44. Is the MMWLR compliant with the metric system?

45. What is the vehicle configuration for the radar for all terrain operations?

46. What is the detachment strength required to deploy and operate the system?

47. What are the deployment timings with a complete detachment of trained crew?

48. What is the maximum search sector and maximum operating azimuth and elevation coverage?

49. What would be the height difference to enable radar to locate hostile weapon systems?

50. What would be the aspect angle for detection of trajectories?

51. What would be the accuracy (including Circular Error Probability) of radar for detection of various types of targets?

52. What would be the method of carrying out orientation and fixation of the radar and to what accuracy?

53. Is system compatible with IRNSS (NavIC)?

54. Would the system be compatible with multiple GNSS. Please provide the details.

55. Is the system capable to block any GNSS signal as per user requirement and utilise particular signal of GNSS for fixation?

56. What would be the time taken for the radar to carryout computation of detection and presenting the location of various types of targets?

57. What would be the deployment time for opening and closing of the MM WLR?

58. What would be the endurance of radar for 24 x 7 operations?

59. How much rain can the MM WLR sustain during operations?

60. Is there a remote control unit to operate the radar from a bunker/ command post located minimum 100 meters away from the radar vehicle?

Physical Characteristics

61. What will be power requirement of MMWLR?

62. What are the active and passive camouflaging arrangements for deployment?

63. Is the operator console ergonomically designed for continuous operation by operator?

64. Can the radar system carry out mobility in different terrains and gradients?

65. On how many vehicles the MM WLR will be deployed?

66. Is the radar based on single vehicle?

67. What would be the inherent arrangement in the radar to carryout operations during night?

68. What would be the inherent arrangement in the radar to carryout camouflage and concealment during day and night operations?

69. What inherent protections would be included on the radar for protection against physical damages?

70. What are the ergonomic features provided in the MM WLR for the crew to sustain long duration operations in various types of climatic conditions?

Maintenance & Life Cycle Aspects

71. Are any modifications required for different terrains and altitudes?

72. What is the time taken to coming into and out of action?

73. What is Internal and external communication facilities provided?

74. Does the radar has a Built in simulator for practicing maintenance aspects?

75. What is Power supply source?

76. Is the radar built in with test equipment and automatic fault finding in field?

77. What is the power generation system for the radar operation?

78. What is the backup in the form of manual orientation of radar head and fixation?

79. Are ICDs available for radar Integration with in service ETC & BSS?

80. Is there any radiation safety hazard for crew operating the radar?

81. What is the minimum and maximum temperature for operating and storage of the radar and vehicles?

82. What is the expected service life of the system ?

83. What tools and skill are required for routine maintenance and repair ?

84. Is predictive maintenance integrated to reduce downtime?

85. Are spare parts standardised and easily available?

Product Support

86. Ability of the company to sustain product through the life cycle (______ years) (including accessories and upgrades)?

87. How will continuous supply of accessories be ensured from?

88. Recommended requirement of SMTs/ STEs, sig and fixtures?

89. Ease to carrying out the schedule servicing & maintenance tasks. Any recommendation for further easing the task?

90. What are the details of frequency and periodic servicing required to be carried out on the equipment?

Company Details

91. The category of company, whether large/ medium/ small or start-up?

92. Years of existence (Established in _________)?

93. Annual turnover of the company?

94. The credit rating of company and net worth?

95. Annual profit in last three financial years?

96. The shareholding pattern of the company?

97. Whether the company is OEM, manufacturing agency or system integrator?

98. Experience of the company in related fields?

99. Whether similar equipment has been supplied to any other government agency (Type of equipment, quantity and cost)?

100. Whether company has patents/ IPR of any critical components/ Sub-systems?

101. Whether the company has any tie-ups/ joint ventures with any foreign firm for producing similar equipment?

Miscellaneous

102. Is the IPR of the critical technologies held with the vendor?

103. Minimum quantity economically viable for business?

104. Confirm whether the Original Equipment Manufacturer (OEM) is willing to carryout Transfer of Technology and also Maintenance Transfer of Technology (ToT/MToT) to GOI along with the equipment?

105. What is the details of important sub-systems & enabling technologies for MMWLR?

106. Critical technologies identified for the system that will be D&D indigenously & details of critical technologies not likely to be available in India, to be sourced ex-import.

107. What is the time to develop the radar?

108. What is the overhaul and change time of major components?

109. What is the cost of prototype & the product?

110. What is the quantity of prototype recommended for user trial?

111. Likely time for development of the prototype (in week) and likely manufacturing capabilities of the product (per year capability).

112. Likely achievable IC at prototype stage & at production stage?

113. What is the warranty period and Annual maintenance being offered?

114. What is level of maintenance and repair training being offered?

115. What is the assistance required from Indian Army?

116. The questionnaire is required to be respond by prospective vendors to the contact person mentioned at para 133 within 21 days of loading on the Department of Defence Production website.

117. What will be the likely min RCS reqd for UAS/ Heptrs detection by rdr?

118. How many tgts can simultaneously be tr by the rdr?

119. Can the rdr integrate with existing AAD/Arty networks?

120. Can the rdr integrate with response wpn sys like AD guns, Arty guns, Gun Msl sys.

121. Can the rdr support IFF for UAS?

Infrastructure.

122. Does the company have adequate infrastructure to develop, integrate and manufacture? If not, what would be the procedure and timelines to establish the same?

123. Does the company have adequate infrastructure for carrying out trials and testing of the equipment?

Cost.

124. Minimum quantity economically viable for business?

125. Cost of the prototype & the product during manufacture?

126. Quantity of prototype recommended for user trial?

Indigenous Content.

127. Likely achievable IC at prototype stage & at production stage?

128. Details of important sub-systems & enabling technologies for MMWLR?

129. Critical technologies identified for the system that will be Design & Development indigenously & details of critical technologies not likely to be available in India, to be sourced ex-import.

130. Details of IPR held?

131. **Timelines.** Likely time for development of the prototype (in weeks) and likely manufacturing capabilities of the product (per year capability).

132. **Response Time.** The complete questionnaire is requested to be responded by prospective vendors to the contact person mentioned below within 21 days of loading on the Department of Defence Production website.

133. **Contact Details.**

____
Directorate General of Artillery/ Artillery-9
300-A, C Wing, Sena Bhawan,
IHQ of MoD (Army)
New Delhi-110011
Tele - 011-23018527
Email - rtproc-vis@gov.in

Appx-B

INFORMATION PROFORMA FOR INDIAN VENDORS

1. **Name of the Vendor/Company/Firm**.

____

____

(Company, in brief, to be attached)

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

   (a) Original Equipment Manufacture (OEM) : Yes/No
   (b) Authorised Vendor of foreign Firm : Yes/No (attach details, if Yes)
   (c) 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 _______________ Tele : _________________ Fax : ____________________

5. **Financial Details**.

   (a) Category of Industry (Large/Medium/Small Scale) : _______________

   (b) Annual turnover: _____________________________________ (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**.

Name of Agency	Certification	Applicable from (Date & Year)	Valid till (Date & Year)

7. **Details of Registration**.

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

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

Name of Organisation	Membership Number

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

(a) Name of Product: ____
(Should be given category wise for e.g. all products under night vision devices to be mentioned together)

(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. Alternative for meeting the objectives of the equipment set forth in the RFI.

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)