BRIEF OF THE PROPOSAL: DRONE BASED FOLIAGE PENETRATION (FOPEN) RADAR

1. **Name of Proposal**. Drone Based Foliage Penetration (FOPEN) Radar.

2. **Use Directorate in SHQ**. Directorate General of Infantry/Infantry-5.

3. **Brief Description**. Indian Army is constantly engaged in combating threats in conventional and sub conventional domain. The emerging security challenges and the constant evolution in Hybrid Warfare necessitates maintenance of technological edge through procurement of new generation equipment for Indian Army. Recent terrorist activities has validated the criticality of procuring Drone Based FOPEN Radar for detection of movement through dense foliage & thick forest canopy.

4. **Technical Parameters**. Broad Parameters are:-

(a) **Drone**.

(i)	AUW	-	Not more than 20Kgs
(ii)	Endurance	-	60-120min
(iii)	Rg	-	5-10Km
(iv)	Op Alt	-	High Altitude
(v)	Op Temp	-	$-20^{O}C$ to $+50^{O}C$

(b) **FOPEN Radar**.

(i) Dense Foliage Penetration capability.

(ii) Adequate Stand-off distance.

(iii) Light weight.

(iv) Real Time data transmission for troops on ground.

(v) Capability to be deployed in ground role & man pack carriage.

(vi) Op Altitude upto 4500 meters.

5. **Indigenous Content**. Minimum 60% IC.

6. Interested developing agencies are requested to respond to the questionnaire alongwith Technical Proposal for the equipment at **Appendix** attached for shortlisting.

Appendix
(Ref Para 6 of Brief of the proposal)

QUESTIONNAIRE ALONGWITH TECHNICAL PROPOSALS FOR DESIGN AND DEVELOPMENT OF DRONE BASED FOLIAGE PENETRATION (FOPEN) RADAR AS MAKE II PROJECT

1. **Company Details**.

(a) The category of company, whether large/ medium/ small or start up?

(b) Years of existence (Established in _____)?

(c) Annual turnover of the company?

(d) The credit rating of company and net worth?

(e) Annual profit in last three financial years?

(f) The shareholding pattern of the company?

(g) Whether the company is OEM, manufacturing agency or system integrator?

(h) Experience of the company in related fields?

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

(k) Whether company has patents/ IPR of any critical components/sub-systems?

(l) Whether the company has any tie-ups/ Joint ventures with any foreign firm for producing similar equipment?

2. **Infrastructure**.

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

(b) Does the company have adequate infrastructure for carrying out trials and testing of the equipment?

3. **Cost**.

(a) Cost of the prototype and the product (unit cost and total cost)?

(b) Minimum quantity economically viable for business?

(c) Quantity of prototype recommended for user trials?

4. **Indigenous Content**.

(a) Likely achievable indigenous content at prototype as well as production stage?

(b) Details of important sub systems and enabling technologies of Drone Based Foliage Penetration Radar?

(c) Critical technologies identified for the system and details of critical technologies not likely to be available in India, to be sourced ex-import (in cost percentage terms)?

(d) Sub-systems/ equipment manufactured by the company and details of outsourced equipment along with details of the manufacturer?

(e) Details of Intellectual Property Rights (IPR)?

(f) What is the future plan for indigenisation of niche technologies being used ex import?

5. **Time for Manufacture**. Likely time for development of the prototype (in weeks) and manufacturing capability of the product (per year capability)?

6. **Broad Details/Technical Specifications of Existing Products/ Under Development or Capable of Being Manufactured**.

(a) **Drone**.

(i) What is the maximum launched altitude for the Drone?

(ii) What is the maximum altitude Above Ground level (AGL) when launched from maximum launch altitude?

(iii) What is the operating temperature range of the Drone?

(iv) What is the maximum operating range (one way)?

(v) What is the endurance of the drone in minutes, when launched from maximum altitude?

(vi) What is the weight of the drone (excluding the Foliage Penetration Radar payload)?

(vii) Is the drone compliant as per IP 65 or better standards?

(viii) What is the maximum area required for launch and recovery of the Drone?

(ix) Is the drone compliant to Data Link as per S/C Band (2 GHz to 6 GHz) with 256 bit AES encryption?

(x) Is the drone compatible with NAVSTAR, GLONASS & IRNSS? Does the operator have the option of selecting deselecting & blocking any of the available GNSS Service?

(xi) Is the drone compatible with Defence Series Map having Shape File Format?

(xii) What are the Flight Modes available in the drone?

(xiii) What is the maximum wind speed tolerance?

(xiv) How many personnel are required as crew to operate the drone?

(xv) What is the shelf life of the drone in maximum number of landings?

(xvi) What type of battery will be used & life of the battery?

(xvii) What will be endurance time for the drone with all systems functioning with one full charge of the battery?

(xviii) What will be the minimum number of rechargeable cycles for the battery?

(xix) Will the battery be rapid rechargeable type?

(xx) Will the drone be man portable or will it require a special carrier vehicle or be portable to be carried on in service vehicle?

(b) **Foliage Penetration (FOPEN) Radar**.

(i) What is the operating altitude of the Foliage Penetration Radar?

(ii) What is the operating temperature range of the Foliage Penetration Radar?

(iii) What is the maximum Foliage Penetration in meters that can be achieved?

(iv) What is the minimum and maximum stand-off distance in meters, required for achieving the maximum Foliage Penetration?

(v) What is the endurance of the Foliage Penetration Radar in minutes, when operating continuously?

(vi) What is the weight of the Foliage Penetration Radar (only for payload that would be mounted on the drone)?

(vii) Is the Foliage Penetration Radar compliant as per IP 65 or better standards?

(viii) Does the Foliage Penetration Radar **provide Real Time Data Transmission**?

(ix) What is the Latency (in seconds) of Foliage Penetration Radar for data transmission?

(x) Is the Foliage Penetration Radar based on **Synthetic Aperture Radar (SAR)**?

(xi) Which Band does the Foliage Penetration Radar operate on?

(xii) What is the Shelf Life (in years) for the Foliage Penetration Radar?

(c) **Product Support**.

(i) What is the ability of the company to sustain the eqpt through the life cycle (in years) (including accessories and upgrades)?

(ii) How will continuous supply of accessories be ensured?

(iii) Recommended requirement of SMTs/STEs?

(iv) Warranty period of the product?

(v) Is the eqpt modular in construction ? Is modular level replacement possible at field level ?

(vi) Facility for software calibration & loading all software post repair ?

(vii) What are the repair facilities in terms of infrastructure and test equipment required for providing effective engineering support for Foliage Penetration Radar (FOPEN Rdr) ?

(viii) Will you be providing all **Special Maintenance Tools/ Special Test Eqpt/Test Jigs (SMTs/STE/TJs)** for the eqpt to support diagnostics and repairs at various echelons other than the SMTs/STE mentioned above ?

(ix) Will you be providing repair and calibration cover for Special maintenance Tools (SMTs) and Special Test Eqpt (STE) ?

(x) Are factory repair facilities of the eqpt and all of its sub accessories available in India with the vendor ?

(xi) What is the provision of intimation and incorporation of upgrades and retro modification, if any, in the eqpt and its accessories during the life cycle ?

(xii) Will you be providing the following detailed tech literature as per joint Service Specification (**JSS-0251-1**) for sustenance of the equipments :-

(aa) User Handbook/ Operators Manual.

(ab) Design Specifications.

(ac) Technical Manuals :-

(aaa) **Part I**. Technical description, specifications, functioning of various systems.

(aab) **Part II**. Inspection/ maintenance tasks, repair procedures, materials used, fault diagnosis and use of Special maintenance Tools/ Special Test Equipments (SMTs/STE).

(aac) **Part III**. Procedure for assembly/ disassembly, repair upto component level, safety precautions.

(aad) **Part IV**.

(aaaa) Part list with drawing reference.

(aaab) List of Special Maintenance Tolls/ Special Test Equipment's (SMTs/STE) with Test Bench.

(ad) Manufacture's Recommended List of Spares (MRLS).

(ae) Illustrated Spare Part List (ISPL).

(af) Technical manuals on Special Test Equipment's (STEs) with drawing reference.

(xiii) Will you be providing a **Class III or above Interactive Electronic Technical Manual (IETM)** for above technical literature ?

(xiv) Will you providing **Built in Test Equipment (BITE) and Power On Self-Test (POST)** facility in the equipment and continuous BITE and user demand BITE for constant monitoring of all functions to indicate failures, whenever this occurs in the system ?

(d) **Other Aspects**.

(i) Provide details of algorithms used in the equipment ?

(ii) Provide details of architecture of the complete equipment ?

(iii) Any other relevant details about the system, if not included in the Questionnaire may be provided.

7. **To understand technical & physical specifications desired, Infantry Directorate may please be contacted**.

8. **Contact Details**.

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