

Appendix 'B'

(Refer Para 3 of Mod (AC), DGMF letter No A/35854/PPP/Make/GS/Mod (AC)/2016 dt 10 May 2016)

**INPUTS FOR FEASIBILITY STUDY FOR MAKE PROJECTS :
ENVIRONMENTAL CONTROL UNIT (ECU) FOR TANK T-90 S/SK**

1. **Government of India (GoI), Ministry of Defence (MoD), is considering procurement of quantity 1657 (approximately) of Environmental Control Unit (ECU) for tank T-90 S/SK under Make-II category of DPP-2016. Original Equipment Manufacturers interested in supplying the equipment may furnish information given in succeeding paragraphs.**
2. **Brief Description of Equipment.** The Environmental Control Unit (ECU) is an add-on-equipment for the tank for efficient functioning of the high technology equipment fitted in the tank as well as for enhancing efficiency of the crew performing in the extreme temperatures by bringing down the temperature inside the crew compartments (Driver, Gunner and Commander Compartment).
3. You are requested to provide specific replies to the queries at **Annexure-I** attached.
4. Please confirm that your firm has the technology & capability to manufacture Environment Control Unit (ECU) for Armoured Fighting Vehicles and that you are willing to supply it to the Government of India (GoI), Ministry of Defence (MoD), India as per provisions given in chapter-III of Defence Procurement Procedure (DPP) 2016 issued by the MoD, Govt of India.
5. The delivery of the equipment and training should be completed within 24 months from the effective date (D) of the contract, as per the following schedule:-
 - (a) D+6 - Delivery of 414 sets.
 - (b) D+12 - Delivery of 414 sets.
 - (c) D+18 - Delivery of 414 sets.
 - (d) D+24 - Delivery of 415 sets.
6. Please forward details of your company and products which are suitable for our requirement to include following:-
 - (a) Name, address, telephone numbers, fax numbers, website and e-mail address.
 - (c) Areas of core competence of your company.

(d) Details of products manufactured by your firm which are likely to meet the requirement of MoD, India.

(e) Specifications with regard to characteristics as asked for in the questionnaire at Appendix.

(f) Details of your past customers with special reference to the equipment required by MoD, India.

(g) Tentative cost (cost intimated here is indicative and is not binding while making a commercial bid subsequently) to include factors such as AMC, product support package, training etc.

(h) Manufacturing capacity in Numbers every month / delivery schedule.

7. The required information/details may please be forwarded at the following address by **15 Jun 2016**. For queries if any, contact at **011-23335094**.

**Directorate General of
Mechanised Forces (Mod/AC)
General Staff Branch
Room No 501, A Wing, Sena Bhawan
Integrated HQ of MoD (Army)
DHQ PO, New Delhi – 110 011
Telefax No : 011-23335094**

QUESTIONNAIRE: ENVIRONMENT CONTROL UNIT (ECU)
FOR TANK T-90 S/SK

- Q.1. Is the ECU an integrated and compact system, what is its weight and dimensions?
- Q.2. Does the system change the silhouette of the tank or foul with existing features on the tank?
- Q.3. Could the system be fitted in such a way that the existing fitment items in the crew compartment should not be removed, however if relocated same should not compromise the op efficiency of the tank?
- Q.4. Is the system protected from small arms fire and splinters as per Stanag 4569 level-3 ?
- Q.5. Is the system rugged enough to withstand the normal hazards of cross country move in plains, semi desert and desert terrain?
- Q.6. What is the minimum operating life and shelf life of the system?
- Q.7. Does the system comprise of sealed units and not permit seepage of water during fording (upto 5 meters)?
- Q.8. What EMI/EMC standards does your system comply with?
- Q.9. Is the ECU capable of operating continuously for minimum 10 hrs without affecting its efficiency?
- Q.10. Is the ECU easy to retrofit onto a T-90S/SK tank at field workshop level?
- Q.11. Are the assemblies / components of the system less those which require air for inlet/ cooling/ exhaust hermetically sealed?
- Q.12. Is the system modular in design?
- Q.13. Does the fitment and integration of the ECU with tank T-90 S/SK involve any cutting of armour and drilling. If resorted to, should not be in the frontal 60⁰ arc of the tank?
- Q 14. Can the main assemblies of ECU, heat exchangers and pump etc be placed in the present location of SPTA/assembly box outside the turret with only the cooling units and ducts inside the air compartment to direct cool air at entire crew stations viz driver, gunner and commander and electronic systems/subsystem in the vicinity.

Q.15. Does the fitment of the system jeopardize the combat effectiveness of the tank in any way?

Q.16. Does the fitment/integration of the ECU with tank T-90 compromise the overpressure system and NBC protection system of the tank?

Q.17. What are the specifications of air conditioner in terms of :-

- (a) Type.
- (b) Air Circulation.
- (c) Final inside temperature desired.
- (d) Relative Humidity of cooled air.
- (e) Type of coolant used.
- (f) Minimum useful cooling efficiency at ambient temperature.

Q.18. Does it provide adequate cooling inside the crew compartment for efficient functioning of the electric system / sub systems in the ambient temperatures obtaining in our deserts, semi deserts and plains in all seasons?

Q.19. Does the ECU have an inbuilt protection system against high voltage current?

Q.20. Is the ECU form fit design and does not affect the performance of the tank with reference to operational capability of the tank?

Q.21. Does the ECU impact the existing sealing of the tank against dust and moisture?

Q.22. Does the ECU have adequate test/inspection points/lights and built in gauges for checking performance fault findings?

Q.23. Does the ECU system have self diagnostic inbuilt in the system?

Q.24. Does ECU system provide temperature difference of 10°C to 15°C in the breathing area of crews?

Q.25. Does ECU system have an air conditioner/blower option to be selected by crew as per requirement?

Q.26. Is the ECU system capable of operating in temperature ranges of -15⁰ C to + 55⁰ C?

Q.27. Is the ECU system capable of operating in environment conditions available in the sub-continent and conform to JSS-5555 standards?

Q.28. Does ECU system have a built-in test facility to isolate a defect that has occurred in the system?

Q. 29. Does ECU system meet the MIL Std 461E with regard to EMI/EMC compatibility?

Q. 30. Is ECU system compatible with the main power supply of the AFV with a voltage range from 22 V DC to 29 V DC and output from Auxiliary Power Unit which produce DC Voltage of 27.5 ± 1 V?

Q.31. Is adequate literature and informative material for reference by user and EME for preparation for Engineering Support Documents available? Will the following be provided:-

- (a) User's manual?
- (b) Technical manual?
- (c) Field Repair manual?
- (d) Base repair manual?
- (e) ISPL?
- (f) MRLS and expected wastage data assembly /PCBs, spare for four years?
- (g) Fault diagnosis manual?
- (h) Two sets of drawing/circuit diagnosis drawings?
- (j) Soft ware documents?
- (k) CBT on CDROM for assembly/sub assembly and fault finding procedure for training of EME tradesmen?

Maintenance

Q.32. What is the reliability of the system in terms of MTTR and MTBF?

Q.33. Is the system capable of functioning for minimum mean time between overhaul (MTBO) of 5000 hours?

Q.34. Does system permit servicing/ repair/ maintenance/ replacement of minor assemblies without removal of whole ECU?

Q.35. What are the numbers of SMTs/STE/Gauges required for maintenance at unit and field workshop level?

Q.36. Is the comprehensive software for fault diagnosis upto component level in sub systems and PCBs described?

Q.37. Will the training of maintenance personnel for repair and maintenance of equipment be provided?