

QUESTIONNAIRE - EOIRST UNDER MAKE-I CATEGORY

1. **Background.** The Ministry of Defence, Government of India, intends to procure Electro Optical Infra-Red Search and Track (EOIRST) System **through Make-I procedure of DAP-2020**, as a new induction.

2. **Description.** The Electro Optical Infra-Red Search and Track system is an advanced electro optical system for passive search, detection, recognition, classification and tracking of surface, coastal and air targets. EOIRST provides 360-degree surveillance, tracking through passive sensing. It consists of an Optical surveillance and tracker system and has a high refresh rate in surveillance mode.

3. **Operational Philosophy.**

(a) The system should offer continuous, 360° passive surveillance and detection of surface, coastal and air targets around the ship in auto, semi-auto and manual mode using its integral sensors, together or independently.

(b) When selected, the system should be capable of tracking targets automatically.

(c) The system should provide an independent Operator's Console (OC) with advanced MMI features for display of the all-round picture and for carrying out all associated functions. If required, the system should be capable of being operated from other designated systems with modular software embedding.

(d) The system would be interfaced with the following for exchange of target information:-

(i) **CMS.**

(aa) The system should be able to give Target Indication (TI) to CMS for further designation to ships sensors and weapon systems.

(ab) The system should be able to receive TI of a target from CMS for investigation using its integral sensors and tracking.

(ii) **Gun**. The system should either be able to act as a Fire Control System or be able to give TI/ TD to the Fire Control System (FCS) of designated Guns for firing, where FCS already exists.

4. **Total Quantity and Prototypes**. A total of 24 Electro Optical Infra-Red Search and Track (EOIRST) Systems would be required by the Indian Navy.

5. **Questionnaire**. In order to identify prospective vendors who can undertake the said project, the vendors are requested to furnish information as elucidated in succeeding paragraphs including those at Annexure. Limiting parameters (if any) have been indicated against the relevant parameter.

TECHNICAL SPECIFICATIONS

Q1. Vendor to specify the following:-

<u>Ser</u>	<u>Parameter</u>	<u>Vendor to Specify</u>
(a)	<u>General</u>	
	(i) <u>Weight & Dimensions.</u> Please specify the weight and dimensions of the system. Conformity of weight of payload to within 180 Kg to be specified. General Arrangement (GA) of the planned EOIRST, showing internal layouts, external appendages etc, to be provided.	
	(ii) Details of affiliation to/ classification of the equipment by any accredited classification society	
	(iii) Conformity of equipment fit to latest International regulations, wherever applicable	
	(iv) <u>Above/ Below Deck Equipment.</u> Please specify equipment/ sub-systems, cabling requirements.	
	(v) <u>Operator Consoles.</u> Please specify the number of consoles that are required to be installed. Is there a requirement for the installation of a separate console for maintenance?	
	(vi) <u>System Description.</u> Description of planned components of EOIRST including Control Station and Support Equipment	
	(vii) <u>Safety.</u> Please specify the safety features incorporated in EOIRST towards ensuring safe stowage and exploitation onboard ships	
	(viii) <u>Power Requirement.</u> Specify equipment/ sub systems power requirements AC/DC or both and total load of system.	
	(ix) <u>Ruggedisation.</u> Specify level of ruggedisation of system and sub systems to work in marine conditions.	
(b)	<u>Operational</u>	
	(i) <u>Range.</u> Please specify the minimum and maximum range (max range not less than 20 Km)? What are the operation ranges for detection and tracking of targets?	

<u>Ser</u>	<u>Parameter</u>	<u>Vendor to Specify</u>
	(ii) <u>Speed</u> . Please specify the maximum speed of targets that can be tracked.	
	(iii) <u>Optical Contrast</u> . What are the optical contrast capability of the system? Can the system overlay the Infra-Red image over the Electro-Optical image?	
	(iv) <u>SWIR</u> . Indicate the type and capability of sensors to be utilised.	
	(v) <u>Stabilisation</u> . What stabilisation will the system be provided with? What are the expected limits for successful operation?	
	(vi) <u>TV Camera</u> . What are the camera specifications provided with the system? What is the sensor resolution & field of view of TV camera? Are the following Camera parameters being adhered to:- <div style="margin-left: 40px;"> (aa) Sensor Resolution: $\leq \frac{1}{2}$" HD $\geq 1280 \times 1024$ pixels (ab) Narrow FOV: $\leq 2.4^\circ \times 1.7^\circ$ (ac) Zoom Optical: $\geq 10x$ (ad) Zoom Digital: $\geq 4x$ </div>	
	(vii) <u>Thermal Imager</u> . Specifications of thermal imager including type of cooling and the maximum temperature at which it can operate?	
	(viii) <u>Laser Range Finder (LRF)</u> . Specification of LRF and minimum and maximum range (Maximum range not less than 20 Km)?	
	(ix) <u>LRUs</u> . How many LRUs would be there in total? No of LRU for above and below deck to be specified.	
	(x) <u>Recording & Playback Equipment</u> . Specification of VCR provided?	
	(xi) <u>Switch On/ Reaction Time</u> . What is the switch on-time and the reaction time between detection of a target and the generation of a fire control solution?	
	(xii) <u>Data Recording System</u> . What are the specification of the data recorder? Will the system be able to analyse target	

<u>Ser</u>	<u>Parameter</u>	<u>Vendor to Specify</u>
		tracking errors, laser ranging, own ship data and fall of shot correction applied?
	(xiii) <u>Continuous Operation.</u>	What is the duration of continuous operations? (Not less than 500 h)
	(xiv) <u>Weather Capability.</u>	Can the system be exploited up to sea state 6 and wind speed of 25 m/sec?
	(xv) <u>EMI/ EMC.</u>	Will the system have total electro-magnetic compatibility with all ship board equipment?
	(xvi) <u>GCIU Characteristics.</u>	Is the system capable of controlling the ship's guns for surface, NGS and anti-air engagements? Will the system be capable of controlling guns of calibre ranging from 20-mm to 127 mm?
	(xvii) <u>FCS.</u>	What are the characteristics and algorithm of software? Willingness to offer software and control algorithms for clearance by QA agencies?
	(xviii) <u>CFAR.</u>	What is the false alarm rate for detection and tracking of targets?
	(xix) <u>Trials.</u>	Would the FAT/ HAT/ SAT schedule be forwarded to IN for collegiate vetting on selection? Would the system be offered for trials on NCNC basis?
	(xx) <u>Acceptance.</u>	Would the acceptance process be video recorded and handed over to IN for collegiate vetting?
	(xxi) <u>Dockyard.</u>	Willingness to install dockyard level package for repairs?
	(xxii) <u>Blind Arcs and Inertial Tracking.</u>	Will the system cater for blind arcs caused by obstruction like main mast, thus providing 360° coverage? Is the system equipped with inertial tracking in case of natural obstructions?
	(xxiii) <u>Interfacing.</u>	Can the system be interfaced with legacy C4I2 systems and other sensors and weapons?
	(xxiv) <u>Supply Chain Management.</u>	What are the supply chain management measures in place?

<u>Ser</u>	<u>Parameter</u>	<u>Vendor to Specify</u>
	(xxv) <u>Training</u> .	Would IETMs/ CBTs provided towards training? Will there be evaluation and certificate provided to the personnel undergoing OEM training??
(c)	<u>Maintainability and Ergonomic Parameters</u>	
	(i) <u>Safe Stowage</u> .	Are there any limitations of roll/ pitch for safe operations onboard a ship?
	(ii) <u>Automated Test Equipment</u> .	What are the types of Automated Test Equipment available with the system?
	(iii) <u>BIT</u> .	What kind of Built-in-Test (BIT) facility would be available in the system?
	(iv) <u>Shelf Life</u> .	What is the projected shelf life of the system when stowed onboard the ship as well as ashore and its associated system?
	(v) <u>Integrated Logistic Support</u> .	What is the scope and depth of Manufacturer Recommended List of Spares? What is the Mean Time Between Failure (MTBF) and Mean Time to Repair (MTTR) of the FCS and its associated systems?
	(vi) <u>Transportability</u> .	Can the systems be transported and delivered to respective Material Organisation of IN?
	(vii) <u>Quality Assurance</u> .	What are the QA standards that the equipment (including components) will comply to? Please state the DIN standards/ other standards of compliance.
	(viii) <u>Infrastructure (Operational and Maintenance)</u> .	Is there specific requirement of shore based infrastructure for stowage of the system and its preparation/ testing? Is there a requirement for setting up of a reference system ashore?
	(ix) <u>Engineering Support Package</u> .	Would the vendor provide customer support in terms of a Comprehensive Annual Maintenance Contract?
	(x) <u>Spares</u> .	What would be the lead time to supply BQs and spares to IN?
	(xi) <u>Demonstration</u> .	Willingness to provide demonstration maintenance procedure?

<u>Ser</u>	<u>Parameter</u>	<u>Vendor to Specify</u>
	(xii) <u>NATO Codification</u> . Willingness to submit NATO codification no. for parts being supplied?	
	(xiii) <u>Simulator</u> . Will simulators be provided?	
	(xiv) <u>Reliability</u> . Would the overall system reliability be more than 95%?	

VENDOR INFORMATION

Q2. Indicate Name, Address and Unique ID (if any) of the Vendor/Company/Firm.

Q3. Furnish complete postal address, details of local office/ liaison office in Delhi area (if any)/ in vicinity. Details of single Point of Contact (PoC) for clarification of queries, if any.

Q4. The following details to be provided (relevant documents to be forwarded):-

- (a) Category of Industry (Large/ Medium/ Small Scale).
- (b) Annual Turnover in INR for last 03 financial years.
- (c) Profit/ Loss Statement of the last 03 financial years.
- (d) Number of employees in firm.
- (e) Details of manufacturing infrastructure that would be useful for manufacturing the EOIRST and its subsystems.
- (f) Production capacity per annum.
- (g) Details of earlier contracts with Indian Ministry of Defence/ Government agencies:-

Ser	Contract Number	Equipment	Quantity	Cost

Q5. Does the firm hold any certification by Quality Assurance Organisation? If yes, the following details to be furnished: -

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

Q6. Does the vendor hold membership of FICCI/ ASSOCHAM or other industrial association? If so, name of the organisation, Membership Number and relevant certification to be provided.

Q7. Elaborate in detail upon the capability to indigenously design and develop the required equipment along with justification and documentary evidence. The following are to be specified:-

- (a) Is the design of the equipment and its software Indigenous?
- (b) Details of components that are envisaged to be imported and from where?
- (c) Also indicate willingness to share the Intellectual Property Rights (IPR) of the design.
- (d) Provide details of similar equipment manufactured by the vendor and supplied in India/ abroad.

Q8. Provide details regarding major successful projects/ products/ technologies developed/ under development involving Research and Development in the field of Electro Optical Infra-Red Search and Track, particularly ship borne.

Q9. Does the vendor have the capability to develop EOIRST prototype and produce the same indigenously?

Q10. Does the vendor have adequate infrastructure to develop, integrate, test and manufacture EOIRST? If yes, please provide details of the same. If no, what would be the timeframe for establishing the same?

- Q11. What is the approximate indigenous content (in terms of cost percentages) at both Prototype Development Stage and Production Stage (including sub-assemblies)?
- Q12. What are the anticipated timelines for development of the prototype (including Quality Assessment Tests) and production of bulk quantities? Specify the timelines separately for each.
- Q13. What are the likely design and development costs for EOIRST prototype? What are the quantities that can be manufactured per year during production?
- Q14. What will be the approximate budgetary cost for manufacture of 25 EOIRST systems?
- Q15. Does the vendor have the ability to provide product support for complete life cycle of EOIRST?
- Q16. How will the vendor ensure continuous supply of spares for the system, especially for those components being procured ex-import, if any?
- Q17. What are the vendor's recommended list of Special Maintenance Tools (SMTs), Special Test Equipment (STE), Test Jigs (TJs) and fixtures that would be required for maintenance support of its life cycle?
- Q18. Is the vendor ready to undertake development on No Cost basis in accordance with Make-I scheme including requisite type tests?
- Q19. Is collaboration with one or more foreign/Indian firms envisaged to design and develop the system? If so, indicate the scope of collaboration and details of ToT envisaged.
- Q20. Is the vendor willing to transfer the technology to any DPSUs in future? If yes, will the ToT include the proprietary technologies?
- Q21. Does the vendor have adequate infrastructure to develop, integrate, test and manufacture EOIRST? If yes, provide details of the same. If no, what would be the timeframe for establishing the same?
- Q22. What are the anticipated timelines for development of prototype post award of Project Sanction Order and production thereafter (specify timelines separately for each)? Indicate willingness to progress the prototype development

under Make I and subsequent procurement under Buy (Indian IDDM) Scheme of DAP-2020.

Q23. What are the areas of uncertainty envisaged by the vendor in the design, development and production of the indigenous development of EOIRST?

Q24. Indicate the overall level of indigenisation in the base vehicle and individually for the payloads that is envisaged to be achieved. Approximate breakdown of IC content (in percentage) for each of the sub systems is also to be provided. The procurement would eventually be under Make I, hence, the willingness to meet overall IC content of 50% as per DAP-20, may be confirmed.

Q25. Will the proposing company/ vendor also be manufacturing the production grade system? If not, what is the plan for production of the system post design and development?

Q26. Does the vendor have the ability to provide product support for complete life cycle of EOIRST? Will the vendor also carry out necessary R&D on the future generations of EOIRST?

Q27. Will the vendor also provide upgrades and carry out necessary R&D on the future generations of EOIRST?

Q28. Any other details which the vendor would like to bring before the Feasibility Study may be provided.

STATEMENT OF COST OF PROTOTYPE DEVELOPMENT

<u>Ser</u>	<u>Items</u>	<u>Qty</u>	<u>Imported Components Cost (I)</u>	<u>Indigenous Components Cost (₹) (II)</u>	<u>Approximate Unit Cost in INR (₹) (I) + (II)</u>	<u>Any other details Please mention specific IC content that will be achieved</u>
A.	Cost of fully formed EOIRST	1				
B.	Cost of Fire Control System	1				
C.	Cost of any Special Maintenance Tools or Special Test Equipment	1				
D.	Project Monitoring and Admin costs	-				
E.	Cost of ToT (if any)	-				
F.	Any other Costs (please specify head)					
	Total					

STATEMENT OF COST FOR PRODUCTION GRADE VERSION
(QUANTITY REQUIRED - 25 NOS*)

<u>Ser</u>	<u>Items</u>	<u>Qty</u>	<u>Imported Components Cost</u> (I)	<u>Indigenous Components Cost (₹)</u> (II)	<u>Approximate Unit Cost in INR (₹)</u> (I)+(II)	<u>Any Other Details</u>
A.	Cost of fully formed EOIRST					
B.	Cost of Fire Control System					
C.	Cost of Engineering Support Package (includes Spares, Training, Documentation, Special Tools & Equipment, Installation/HATs/SATs)					
D.	Cost of CAMC					
E.	Any other costs (please specify head)					
	Total					

* **Note:** The quantity indicated for prototype and production is only an indicative requirement and is not a firm commitment. The quantity has been provided so as to enable firms to arrive at economy of scale prior providing statement of cost of production version EOIRST.

CONTACT DETAILS FOR PROJECT (EOIRST)

Name of Project officer : Lt Cdr Viraat Shiggaon,
Designation : Joint Director
Directorate : Directorate of Staff Requirements
Telephone : 011 - 26771346
Email-ID : dsr@navy.gov.in
Fax No : 011 - 26771320
Postal Address : Room No. 206, D Block
Defence Offices Enclave
Africa Avenue
New Delhi 110023