

Tele: 23018527

Directorate General of Artillery
(Artillery - 9)
General Staff Branch
Integrated HQ of MoD (Army)
DHQ PO New Delhi-110 011

A/30305/RWII/GS/190 /Arty-9

20 Mar 2023

**CORRIGENDUM TO EXPRESSION OF INTEREST (Eoi) FOR PROCUREMENT CASE
IN RESPECT OF QTY-SIXTY FIVE (65) TACTICAL REMOTELY PILOTED AIRCRAFT
SYSTEM UNDER 'MAKE-II' CATEGORY**

Dear Sir/Madam,

1. Reference is made to 'Expression of Interest (Eoi)' for procurement case in respect of Tactical (Tac) Remotely Piloted Aircraft System under 'Make-II' category issued by this office vide Eoi No A/30305/RWII/GS36/Arty-9 dated 10 March 2023.

2. The following amendment is to be made in the Expression of Interest (Eoi):-

FOR

Para 34. The responses to this Expression of Interest must be submitted by 1700 hrs on 07 Apr 2023 at the above mentioned address.

READ

Para 34. The responses to this Expression of Interest must be submitted by 1700 hrs on 08 May 2023 at the above mentioned address.



(Sanket Jakhmola)
Col
Secretary, PFT

Rps/-

**INVITATION FOR EXPRESSION OF INTEREST FOR PROCUREMENT OF QUANTITY
SIXTY FIVE TACTICAL REMOTELY PILOTED AIRCRAFT SYSTEM (RUNWAY
INDEPENDENT) UNDER 'MAKE II' CATEGORY OF DEFENCE ACQUISITION
PROCEDURE-2020**

References : Defence Acquisition Procedure - 2020

Appendices :

- Appendix A** : Preliminary Service Qualitative Requirements for Tactical Remotely Piloted Aircraft System (Runway Independent).
- Appendix B** : Commercial Evaluation Criteria.
- Appendix C** : Technical Evaluation Criteria.
- Appendix D** : Correctness Certificate.
- Appendix E** : Confidentiality Agreement.
- Appendix F** : Expression of Interest Compliance Certificate.
- Appendix G** : Information Performa.

1. **Introduction**. Warfare in the modern days demands the ability to acquire high value targets across the spectrum of operations and destroy them with precision with suitable fire power resources. Tactical Remotely Piloted Aircraft System (Runway Independent) can provide a breakthrough against dynamic and static targets by real time acquisition and precision strike. This sensor to shooter link is an operational necessity for effective destruction/degradation of time critical targets as Ground Based sensors have limited surveillance depth. Therefore, there is an urgent need for aerial surveillance platform Tactical Remotely Piloted Aircraft System (Runway Independent) with 80-100 km range for tactical surveillance, target acquisition, Direction of Own Artillery Fire & Post Strike Damage Assessment. Tactical Remotely Piloted Aircraft System (Runway Independent) are ideal for mobile operations, reducing fixed-wing launch and recovery challenges while freeing troops from stationary runway constraints.

2. **Objective**. The objective of this invitation of Expression of Interest is, to seek willingness of Indian Vendors to participate in the Make-II Category for development and procurement of 65 Tactical Remotely Piloted Aircraft System (Runway Independent) under Buy Indian (IDDM) category of DAP-2020. Indian vendors meeting the technical, commercial and project requirements laid out in the Expression of Interest will be issued a 'Project Sanction Order' to develop a prototype as per provisions of Defence Acquisition Procedure-2020.

3. **Layout**. The Expression of Interest has been covered 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 Expression of Interest.
- (e) **Part-V** : Miscellaneous.

4. The nodal officer of this project for all queries / clarifications/ coordination will be **Member Secretary, Project Facilitation Team (PFT)**, Tactical Remotely Piloted Aircraft System (Runway Independent). Address and contact details of the nodal officers are given in **paragraph 33** of Expression of Interest.

PART-I: GENERAL INFORMATION

5. **Nomenclature.** Tactical Remotely Piloted Aircraft System (Runway Independent).
6. **Categorisation.** In accordance with **Para 5 (b) (i) of Chapter-III of Defence Acquisition Procedure-2020. The design and development of the system must be indigenous.** The project is further categorised as under:-
- (a) **Prototype Development Phase.** 'Make-II(Industry Funded)' in accordance with Para 5 (b)(i) of Chapter-III of **Defence Acquisition Procedure-2020.**
- (b) **Procurement Phase.** 'Buy Indian (IDDM)' with minimum 50% IC, in accordance with Para 6 (d) of Chapter-III of **Defence Acquisition Procedure-2020.**
7. **Indigenous Content.** The product will be indigenously designed, developed and manufactured and should have minimum of 50 % Indigenous Content as per provisions of DAP 2020.
8. **Quantities.** The quantities sought for the projects are as under:-

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

<u>Serial No</u>	<u>Item</u>	<u>Quantity</u>
(i)	Tactical Remotely Piloted Aircraft (Runway Independent)	02
(ii)	Ground Control Station	01
(iii)	Remote Video Terminal	01

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

<u>Serial No</u>	<u>Item</u>	<u>Quantity</u>
(i)	Tactical Remotely Piloted Aircraft (Runway Independent)	65
(ii)	Ground Control Station	26
(iii)	Remote Video Terminal	26

9. **Make-II Procedure.** Make-II procedure duly available at Chapter III of Defence Acquisition Procedure-2020, will be referred to hereinafter in the case and a copy of the same is available on Ministry of Defence website. The Project Facilitation Team of Indian Army/ Ministry of Defence constituted will act as interface between Indian Army and Industry during the Design and Development stage of the project. **No re-imbusement of development cost is permissible under Make-II scheme.**
10. **Appreciated Timelines.** Tentative timelines for the project are as given at **Serial No 15.**

PART-II: SCOPE OF THE PROJECT

Tactical Remotely Piloted Aircraft System (Runway Independent)

11. **Scope.** Tactical Remotely Piloted Aircraft System (Runway Independent) is conceived as a capability enhancement project for Artillery and will be developed by the Indian Industry. The project is aimed at meeting this requirement indigenously.
12. **Preliminary Services Qualitative Requirements of the Proposed System.** Preliminary Services Qualitative Requirements (aligned to Defence Acquisition Procedure-2020) of Tactical Remotely Piloted Aircraft System (Runway Independent) is attached at **Appendix A.**

Timeline and Milestones

13. Stages of development and procurement are as per Chapter-III of DAP-2020 and amendments thereto.

14. **Timelines.**

- (a) Prototype development - 48 weeks from the date of issue of Project Sanction Order.
- (b) Production of 65 Tactical Remotely Piloted Aircraft (Runway Independent), 26 Ground Control Station & 26 Remote Video Terminal. - Upto 24 months from the date of issue of Supply Order in 02 lots as under: -

<u>Ser</u>	<u>Timeline (Months)</u>	<u>Quantity</u>	<u>Remarks</u>
(a)	D ₀ +D ₁₂	25	<ul style="list-style-type: none"> • D₀ is the date of contract. • The quantities are tentative. Final quantities will be intimated in the Project Sanction Order.
(b)	D ₁₂ +D ₂₄	40	

15. **Milestones.** Major activities in the procurement are as given below: -

<u>Ser No</u>	<u>Activity</u>	<u>Remarks</u>	<u>Timelines (from AoN)</u>
(a)	Issue of Eol	By Project Facilitation Team (PFT)	T ₀
(b)	Eol Responses Submission	By Eol respondents (Indian Vendors)	T ₀ + 8 weeks
(c)	Eol Responses Evaluation	By Project Facilitation Team (PFT)	6 weeks T ₀ + 14 weeks
(d)	Short listing of DAs and Issue of Project Sanction Order for Development of Prototype	To selected DAs, those meeting evaluation criteria	2 weeks T ₀ + 16 weeks
(e)	Design and Development of Prototype and Prototype Readiness Review	(i) Design & Development of Prototype. (ii) Prototype Readiness Review by PFT to ensure matching of prototype specifications with the User Requirements/PSQRs as per Para 54 of DAP 2020 (iii) More than one review may be conducted, on required basis. Dates will be promulgated by the PFT, as per progress of the project	T ₀ + 16 to T ₀ + 64 weeks
(f)	Single Stage Composite Trials, Conversion of PSQRs to GSQRs, Issue of commercial RFP, Solicitation of Commercial Offers and conclusion of contract.	As per DAP-2020 and amendments thereto (as applicable). Sequence of activity after development of prototype upto signing of contract will be amplified in the PSO.	-

Development of Prototype and Trials

16. Prototype will be developed by the selected vendors after the issue of Project Sanction Order. Prototype Readiness Review by PFT to ensure matching of development of product as per PSQR will be carried out. All possible and reasonable assistance and any clarification related to functional or operational aspects of development as sought by DAs will be provided by Project Facilitation Team (PFT).

17. **Single Stage Composite Trials and Staff Evaluation.** After the prototype has been developed as per Preliminary Staff Qualitative Requirements given at **Appendix A**. Single Stage Composite Trials (SSCT) of the prototype(s) will be carried out. **Service Headquarters will formulate the 'Trial Directive' which will incorporate the parameters for validating the 'Essential Parameters' during SSCT.** Necessary technical literature will be provided by the DAs for the conduct of Single Stage Composite Trials on the prototype.

Solicitation of Commercial Offers

18. A commercial Request for Proposal (RFP) for 'Buy (Indian-IDDM)' phase would be issued to all DA(s) for soliciting their commercial offers. Sequence of activity after development of prototype upto signing of contract will be amplified in the PSO. **Additional technical information/ documentation, as may be necessary including those related to Indigenous Content and IPRs would also be required to be provided by the vendor prior to the issue of Commercial RFP** (as applicable).

Deliverables

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

(a) **Prototype Development Phase.** Two (02) Remotely Piloted Aircraft (Runway Independent), One (01) Ground Control System and One (01) Remote Video Terminal.

(b) **Procurement Phase.** The quantity envisaged for the procurement phase is as under: -

<u>Ser</u>	<u>Eqpt</u>	<u>Qty</u>
(i)	Tactical Remotely Piloted Aircraft (Runway Independent)	65
(ii)	Ground Control Station	26
(iii)	Remote Video Terminal	26

(c) Training and Technical literature to include User Hand Book, Preservation Instructions, Complete Equipment Schedule and Technical Manuals. These will be provided with the equipment during the procurement phase. Details will be further amplified in the Request for Proposal (RFP).

(d) **Warranty.** The goods supplied shall carry a standard warranty for 24 months from the date of acceptance by Joint Receipt Inspection. Details will be further amplified in the Commercial Request for Proposal.

Details of Assistance to be Provided

20. **Assistance to be Provided.** Assistance to Development Agencies will be provided by provision of ranges for carrying out trials. Additional assistance if any, will be solely at the discretion of the Project Facilitation Team. In case any damage occurring to equipment/ property/ personnel resulting from the testing of the job of private entity, the private entity is liable to bear the expenses of repair/replacement of the facility and all necessary insurance coverage for the job shall be the responsibility of the private entity.

Multiple Technological Solutions

21. Multiple technological solutions will not be accepted.

Intellectual Property Rights

22. As per provision of **Para 59, Chapter-III of Defence Acquisition Procedure-2020**. Further, based on development of the prototype, a comprehensive list of design documents (to be informed subsequently) will need to be submitted by the Development Agencies for the Project Facilitation Team.

PART-III: EVALUATION CRITERIA

23. **Commercial Evaluation Criteria.** Expression of Interest respondents will furnish their response to the Commercial Evaluation Criteria as per **Appendix B**.

24. **Technical Evaluation Criteria.** The respondents to this Expression of Interest 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 Development Agencies against Preliminary Staff Qualitative Requirements of Tactical Remotely Piloted Aircraft System (Runway Independent).

25. **Indigenous Content.** Post successful development of prototype(s) under Make-II would result in acquisition from successful DAs through, further procurement will be as per the 'Buy (Indian-IDDMM)' category procedure with a minimum of 50% Indigenous Content in accordance with Para 21 of Chapter-I of DAP 2020.and as per the policy of MoD in vogue.

26. **Additional Information.** Additional information required to be furnished as part of the Expression of Interest response is given at **Appendix G**.

27. **Foreign Collaboration.** If the Expression of Interest 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 14 of Appendix G**).

PART-IV: PROCEDURE FOR SUBMISSION OF RESPONSE TO THE EXPRESSION OF INTEREST

28. The response to the Expression of Interest shall be submitted as per formats given at **Appendix B to G**.

29. **Guidelines for Submitting Expression of Interest Responses.**

(a) The responses should be submitted strictly as per the formats given in respective Appendices. Should a vendor need to mention any other information, a separate column / row may be added. Vendors should provide compliance or non-compliance to parameters and no conditional response/ compliance shall be submitted by the firm/ vendors.

(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.

30. **Rejection Criteria for Selection as Development Agencies.** The following may lead to rejection of Expression of Interest 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 certificate/details as mentioned at **Appendix D to G** of the Expression of Interest.
- (d) Failure to offer compliance to any of the terms and conditions given in the Expression of Interest.
- (e) Any other parameter of the response considered inadequate by the Ministry of Defence, Government of India.

31. **Foreclosure Criteria.** As per provisions of Para 20, Chapter-III of DAP-2020, no government funding is envisaged for prototype development, but there is an assurance of orders on successful development and trials of prototype. No foreclosure of the project will be done after issue of Project Sanction Order other than for reasons of default / non-adherence to Project Sanction Order by vendors or delay by DA to produce the prototype for trials.

32. The Expression of Interest respondent shall submit three (03) copies of response to the Expression of Interest, 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 **Appendix B to G** uploaded alongwith the Expression of Interest. 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 Development Agencies shall also submit a soft copy of the response to this Expression of Interest in a CD/ DVD.

33. **The Envelopes shall be Addressed as under:-**

Secretary, Project Facilitation Team
Tactical Remotely Piloted Aircraft System (Runway Independent)
Artillery-9 (SATA),
Directorate General of Artillery,
Integrated HQ of Ministry of Defence (Army)
Room No 300A, 'C' Wing, Sena Bhawan
DHQ PO, New Delhi - 110011
email id : **aprocc@nic.in**
Tele No -33616

34. The responses to this Expression of Interest must be submitted by **1700 hrs** on **07 Apr 2023** at the above mentioned address.

35. **Confidentiality Agreement.** The Company will be required to sign and honour the 'Confidentiality Agreement' with Ministry of Defence, Government of India. The 'Confidentiality Agreement' will be furnished by each Expression of Interest respondent at the time of submission of Expression of Interest responses as per format given at **Appendix E.**

PART V: MISCELLANEOUS

36. **Pre EoI Responses Meeting.** A pre-response meeting will be held on **27 Mar 2023 at 1430 hrs** at Directorate General of Artillery, Arty-9 (SATA), New Delhi-110011. Vendors are required to submit their queries/ clarifications/ amplifications in writing to this office by **20 Mar 2023**.
37. Guidelines for penalties in business dealings with entities as promulgated by Government from time to time, will be applicable on procurement process & bidders.
38. The Pre-Contract Integrity Pact, listed as detailed in Paragraph 119 of Chapter II of Defence Acquisition Procedure-2020, shall apply mutatis mutandis to the 'Buy (Indian-IDDM)' phase of 'Make' project.
39. An Expression of Interest Compliance Certificate will be submitted as per **Appendix F**.
40. Respondent would be subject to disqualifications if they make false, incorrect, or misleading claims in their response to this Expression of Interest. A 'Correctness Certificate' as per the format at **Appendix D** will be furnished as part of the response.
41. Please acknowledge the receipt of this invitation for Expression of Interest.

File No : A/30305/RWI/GS/36/Arty-9 (SATA)

Dated : 10 Mar 2023

Enclosures: Appendices A to G.



(Sanket Jakhmola)

Colonel

Secretary, Project Facilitation Team

Directorate General of Artillery/

Artillery -9 (SATA)

**PRELIMINARY STAFF QUALITATIVE REQUIREMENT FOR TACTICAL REMOTELY
 PILOTED AIRCRAFT SYSTEM (RUNWAY INDEPENDENT)**

User requirements, as set out in this qualitative requirement, represent attainable ideals as foreseen by the Army Headquarter. If their realization is likely to involve prolonged or extravagant development, or the final production is likely to be unreasonably expensive and complex and difficult to maintain or use, it is requested that General Staff (CD) be informed at the earliest possible date.

1. Reference to General Staff Policy Statements. : -
2. Preliminary Staff Qualitative Requirement No. : **105**
3. Other General Staff Qualitative Requirement which effect this Qualitative. : Nil
4. General Staff (GWE) File No : A/30305/RWI/GS/Arty -9
5. Sponsor : Directorate General of Artillery
6. Nomenclature : The equipment shall be known as "TACTICALREMOTELY PILOTED AIRCRAFT SYSTEM (RUNWAY INDEPENDENT)".
7. Security Classification : **RESTRICTED**
8. Priority for Development : Immediate
9. Date of formulation of this Preliminary Staff Qualitative Requirement : **Final Collegiate held on 09 Feb 2022.**

Introduction and Proposed Service Employment

10. There is a need for equipping the Artillery with an Aerial Observation System which can be deployed in the forward areas to provide the data of static and dynamic targets for engagement by the firepower resources, i.e., Guns and Rockets. This sensor to shooter link is an operational necessity for effective destruction/degradation of time critical targets. The Tactical Remotely Piloted Aircraft System (Runway Independent) will facilitate target acquisition, Direction of Own Artillery Fire (DOOAF) & Post Strike Damage Assessment. The Tactical Remotely Piloted Aircraft System (Runway Independent) are ideal for a dynamic sensor-shooter linkage, reducing fixed-wing launch and recovery challenges while freeing troops from stationary runway constraints. The role of Tactical Remotely Piloted Aircraft System (Runway Independent) will be to facilitate Sensor - Shooter Link and provide target acquisition over an area at a distance upto of 80 to 100 km with endurance of at least six hours including Loiter time over intended target area. It will also act as a force multiplier when used in combination with other manned and remotely piloted aircraft. The availability of Tactical Remotely Piloted Aircraft System (Runway Independent) will enhance the operational capability as under:-

- (a) Faster, shorter and responsive Sensor-Shooter Link to support real time engagement and more importantly provide observation and PSDA, as and when reqd.
- (b) Enable observed fire for long range guns and rocket systems.
- (c) Enable Post Strike Damage Assessment (PSDA) of Targets.
- (d) Provide limited integral aerial surveillance capabilities to Commanders.
- (e) Cover the gap between the mini RPAS and the High Altitude Long Endurance (HALE) / Medium Altitude Long Endurance (MALE) class of RPAS.

11. The aim of this Preliminary Staff Qualitative Requirement is to lay down the broad qualitative requirements for the development of 'TACTICAL (Tac) REMOTELY PILOTED AIRCRAFT SYSTEM (RPAS) RUNWAY INDEPENDENT (RWI)'.

12. **Availability Date.** The 'Tactical (Tac) Remotely Piloted Aircraft System (RPAS) Runway Independent (RWI)' should be available for user trials earliest after approval of TEC.

13. **Aim.** To lay down Preliminary Service Qualitative Requirement (PSQR) for Tactical (Tac) Remotely Piloted Aircraft System (RPAS) Runway Independent (RWI).

ESSENTIAL PARAMETERS

OPERATIONAL PARAMETERS

14. **System Configuration.** The Tac RPAS (RWI) system should consist of the following sub-systems:-

- (a) Aerial Vehicle (AV).
- (b) Sensor package/ Payloads (Day and Night) and Airborne Data Relay (ADR).
- (c) Ground Control Station (GCS) to include power source/generator.
- (d) Remote Video Terminals (RVT).
- (e) Inter and intra communication system.
- (f) Facility to transmit imagery in real time/ near real time to the end user in the industry standard formats used by the three services.

15. **Compliance of Metric System.** The proposed Tac RPAS (RWI) will use 'SI' or 'SI derived' units.

16. **Maps.** The system should be compatible with the following:-

- (a) The application should be compliant to operate Maps produced in WGS 84 Datum and LCC Projection (Two Standard Parallel) based on the under mentioned User defined parameters:-
 - (i) Central Meridian (Origin of Longitude).
 - (ii) Origin of Latitude.
 - (iii) False Easting.

- (iv) False Northing.
- (v) Standard Parallel 1.
- (vi) Standard Parallel 2.

(b) Secure admin based user interface must be provided for entering the above mentioned parameter values.

(c) Application must be compliant to Geo Tiff map file formats and Digital Elevation Model (DEM) data for elevation as an input.

(d) The application should also be capable to ingest Shape file format.

17. **Geo Reference.**

(a) Indian Military Grid Reference should be based on **Defence Series Maps** (DSM) and the equipment display console should be able to simultaneously read out 10 figure Grid Reference as well as Geographical coordinates in degree-minutes-seconds format.

(b) The parameters mentioned in Paragraph 16 (a) above once fed should not be displayed/ visualised anywhere in software system besides the admin console and must be stored in an encrypted form.

(c) Provision to only update/modify/delete the parameters should exist.

Performance Parameters

18. **Launch and Recovery.** The Tac RPA (RWI) should be possible to launch and recover from within an unprepared designated area of 50m x 50m.

19. **Design and Construction.**

(a) The Tac RPAS (RWI) should be capable of Vertical Take Off and Landing (VTOL) or Catapult launch.

(b) The Aerial Vehicle (AV) and the payloads should be modular in design.

(c) The Tac RPAS (RWI) should have low radar signature of $\leq 01 \text{ m}^2$.

20. **Altitude (With Payload).**

(a) Operating Altitude : Upto 4000 M (13000ft) Above Mean Sea Level.

(b) Altitude Ceiling : Upto 5000 M (16000 ft) Above Mean Sea Level.

21. **Endurance.** With maximum All Up Weight (AUW) should be 6 hrs or more (from take-off to landing).

22. **Operating Range (At all Operating Altitude).** The direct Line of Sight control range from GCS should be minimum 80Km.

23. **Speed (for mid fuel weight).**

(a) Maximum Speed : 100 Km/h or more.

(b) Operating Speed : Upto 60 - 100 Km/h.

24. **System Accuracy.** The target acquisition accuracy for targets during flight should be better than 50 meter (CEP).
25. **Navigation System.**
- (a) The system should be compatible with GPS, GLONASS and IRNSS.
 - (b) **Geo Co- ordinate Accuracy.** GPS, GLONASS and IRNSS based accuracy of geo reference co-ordinates should be 50 meter or better.
26. **Mission Capabilities.**
- (a) **Target Acquisition.** The Tac RPA (RWI) should be capable of target acquisition by day and night. The RPAS should be equipped with sensors to enable transmission of MWIR and CCD camera imagery pictures of High Definition (HD) resolution. The system must be able to detect, track, recognise and identify the targets.
 - (b) **Real Time Engagement of Targets.** Once a target has been acquired, the AV sensors should have the capability of 'locking on' to the target and determine impact of incoming shells/ rockets. The GCS computer should have the capability to provide the data to correct the mean point of impact of these rockets/ shells, on to the target. This capability should be both day and night. It should also enable damage assessment once the target has been engaged.
 - (c) **Integration Capability.** The RPAS should be capable of providing output of relevant data through Remote Video terminal (RVT).
 - (d) **Payload.** The system should be capable of operating the Electro Optical (EO) Payloads. The Electro Optical (EO) Payloads system to carry EO payload viz CCD and MWIR for day and night missions. CCD should have switchable panoramic mode.

TECHNICAL PARAMETERS

Aerial Vehicle (AV).

27. **Features.** Essential features of the AV are as follows:-
- (a) An on board auto pilot to control the AV.
 - (b) The airframe should be constructed with lightweight composite material to facilitate low Radar Cross Section (RCS) of $\leq 01 \text{ m}^2$.
 - (c) The design of the airframe should be modular to facilitate containerisation transportation in service transport.
 - (d) The design and the geometry of the fuselage should ensure variety of single or multiple payloads for day and night operations.

28. **Flight Modes.** The AV should be able to operate in the following flight modes:-
- (a) **Fully Autonomous Mode.** Follow a pre-programmed flight path. Dynamic re-programming of the flight path must be possible.
 - (b) **Semi-Autonomous Mode.** Control of heading, air speed and altitude of the AV by the operator with other parameters being controlled by the autopilot.
 - (c) **Loiter Mode.** Fly around a fixed point in minimum two patterns (Selectable radius circle and figure of eight).
 - (d) **Target Seeking Mode.** Keep camera locked on to a fixed/moving target.
 - (e) **Camera Guide Mode.** Follow a locked on moving target.
 - (f) **Manual Mode.** Used in case the pilot physically needs to control the AV for maneuvering (in case of autopilot failure or manual override).
 - (g) **Return Home Mode.** In case during the flight there is a break in communication (duration defined by the user) the AV should automatically change to 'Return to Home' mode. The route for Return to Home mode should be programmable by the user before the mission and capable of being updated during the mission. The AV should land at either the take-off location or a pre-selected way - point (user defined).
29. **Structural Integrity.** The airframe should last for at least 4000 flying hours or sustain not less than 1500 landings whichever is earlier.
30. **Propulsion and Power Systems.**
- (a) **Engine.** Engine noise should not be audible at ground when it is flying 1000m Above Ground Level (AGL). The decibel level at 100 meter Above Ground Level (AGL) should be ≤ 60 dBA.
 - (b) **Fuel System.** The AV should carry fuel for the maximum endurance as specified. A single point refueling should be possible. During flight, fuel management should ensure minimum shift of centre of gravity as the fuel is consumed.
 - (c) **Power Supply.** Engine driven alternators and batteries should supply electrical power to all on board systems. Necessary margin of at least 30% of the total power for redundancy and protection devices should be provided. The batteries should cater for back of 90 minutes to recover the RPAS safely in case of generator/ alternator failure.
31. **Payloads.** The system should cater for operation of Electro Optical Payloads: -
- (a) **Optical Sensor (Day Video Camera, Night Camera, Medium Wave Infra-Red (MWIR) Camera and Laser Range Finder (LRF).** The RPAS should have established Gimbal Payload Assembly (GPA) to house the CCD camera (colour), MWIR and Laser Range Finder (LRF). The GPA should have different modes of operation like position mode, search mode and track mode:-
 - (i) The optical sensor should provide output in a digital format and housed on a Gimbal Payload Assembly (GPA) providing stabilisation with pointing accuracy of 15 minutes ($1/4^0$) and jitter isolation of 30 micro radian.

- (ii) GPS/GLONASS/IRNSS and inertial Measurement Unit data should be integrated with the data from the sensors.
- (iii) It should be capable of being panned to 360⁰ (continuous) and have angular coverage from +10⁰ to - 60⁰ in elevation.
- (iv) The optical sensors should be capable of taking still images.
- (v) The minimum observation ranges (slant ranges) to be achieved under clear weather conditions are:-

Sensor	Detection	Recognition	Identification	Target Size	Sensor Altitude
CCD Camera	15 Km	15 Km	05 Km	2.3x 2.3 m	3000 m AGL. Payload should perform at higher altitudes as long as the target is within the sensor slant range capability
MWIR	10 Km	05 Km	03 Km		

(vi) **Colour Day Video Camera.**

(aa) Be capable of providing real time video from the day sensor of minimum 1280 x 780 pixels' resolutions at not less than 20 frames per second.

(ab) Have a 30X or higher continuous optical zoom.

(vii) **Night Camera.**

(aa) Provide real time video of minimum 640 x 480 pixels' resolutions at not less than 20 frames per second.

(ab) Enable reversing the polarity of the display i.e. white hot and black hot.

(viii) **LRF.** Maximum range of 20 Kilometer.

32. **Security.**

(a) A security mechanism should be provided to detect and prevent unauthorised alteration of input or transmitted data.

(b) It should have the capability of Anti Jamming / Anti Spoofing.

33. **Permissible Initialisation Period.** The initialisation should be operational within ten minutes of switching on.

Ground Control Station (GCS)

34. **Features of GCS.** The GCS should be ruggedized and of modular design and capable of rapid deployment the GCS should be vehicle based. The design characteristics of the GCS should offer very friendly man-machine interface, and software programmable with cockpit like human factors. The GCS should feature necessary aids for planning, controlling and monitoring of complete RPAS mission as under:-

- (a) Carry out diagnostic tests on AV, payload and communication data links. There should be a self-test facility for the GCS.
- (b) Mission planning capability prior to commencement of flight and alteration to autonomous flight plan/ way points during mission.
- (c) Display of all parameter essential for AV controller.
- (d) Electronic map display with provision for selection of scales.
- (e) Record AV flight parameter during mission.
- (f) Necessary man-machine interface for the AV operator and payload operator.
- (g) Should have storage capacity of 1.0 Terabyte and UPS backup for 30 minutes.
- (h) Payload operation with image exploitation facility, target acquisition, target coordinate computation.
- (j) Post mission analysis and target folder generation.
- (k) Image recording on CD/DVD facility.
- (l) The software should comply to the relevant paragraphs of IEEE-12207 standards.
- (m) **Pilot-Observer Function.** It is desirable to have modular & user friendly system for control of EO & MWIR payload during missions. It should include following:-
 - (i) Switching on/off sensor (TV/MWIR).
 - (ii) Selecting Field of View (FoV).
 - (iii) Mode selection (Rate, position, track point to window etc).
 - (iv) Zooming.
 - (v) Real time image processing for target acquisition.
- (n) **Mission Planning Function.** For planning, controlling and monitoring the RPAS mission with a digital map display, the system should ensure the following:-
 - (i) **Creating a Mission Plan.** Mission plan segments attributes to include altitude, speed, position, payload control and data link control.
 - (ii) Provision for up-loading mission plan into RPAS prior to flight and modifying it while in flight.
 - (iii) Capability to handle maps of different scales.

- (iv) DSM compatible.
- (v) Computation and display of:-
 - (aa) RPA location and track.
 - (ab) Target location.
 - (ac) Sensor field of view.
 - (ad) Data link coverage.
- (vi) Video recording and playback facility.

35. **Display.** The GCS should:-

(a) **Display.** High Definition, sunlight readable to display imagery of all Electro Optic sensors.

- (i) Screen Size : ≥ 15 inches.
- (ii) Operating system : Windows X/ latest version.
- (iii) Processor : $\geq i5$ with Quad Core.

(b) **Video.** Display User selectable flight and mission information as an overlay on top of the video and save it for future debriefing. The mission information should include:-

- (i) Coordinates of the target.
- (ii) Altitude of target above Mean Sea Level.
- (iii) AV Position.
- (iv) Height of AV above ground level.
- (v) Distance of AV from GCS.
- (vi) Distance of AV from target.
- (vii) Mission Time.
- (viii) Time of imagery.
- (ix) North arrow.

(c) **Map.** A moving map to be provided in a resizable window with the following facilities.

- (i) Map to be synchronised both in position and scale to the video as per specified zoom.
- (ii) Display the current position and heading of the AV as an icon.
- (iii) There should be facilities to:-
 - (aa) Change between 3D and 2D view.
 - (ab) Annotate the map.
 - (ac) Allow free movement (dragging) of the map, centre the map on the cameras ground track, centre the map on a specific area, see the map from the cameras point of view, fix the map so that it does not change with the movement of the AV and resynchronise the map to the AV, as desired.
 - (ad) Measure distance between ground points.
 - (ae) Enlarge and reduce the map (Zoom in /out) upto 10X.

Remote Video Terminal (RVT)

36. The RVT should be capable of being remotely located within the communication range of the AV of minimum 20 Km and be tuned to the AV's downlink frequency. It should be ruggedized portable computer based with a resolution of minimum 1280 x 780 pixels, screen size of ≥ 13 inches and have the following facilities:-

- (a) Simultaneous display of live video and a synchronised moving map in resizable windows in real time.
- (b) Record and replay the optical sensor output, telemetry and mission flight data. A solid State Disk (SSD) of minimum 1 TB must be provided.
- (c) Provide video freeze frames (Snapshots) and video clippings of the live feed from the optical sensors. Suitable software should be provided for subsequent annotation of the extracted snapshot/ video clipping with icons provided by the vendor.
- (d) Upload digital maps from an external CD/DVD/ Hard disk.
- (e) Cater for minimum of 8 hours of continuous operations with an additional minimum 8 hours spare battery for back up provided.
- (f) Provide video output through an HDMI port.

37. **Display.** The RVT should:-

(a) **Video.** Display User selectable flight and mission information as an overlay on top of the video and save it for future debriefing. The mission information should include:-

- (i) Coordinates of the target.
- (ii) Altitude of target above Mean Sea Level.
- (iii) AV Position.
- (iv) Height of AV above ground level.
- (v) Distance of AV from RVT.
- (vi) Bearing (Azimuth) of AV from RVT.
- (vii) Mission Time.
- (viii) North arrow.
- (ix) Time of imagery.
- (x) Communication link status.

(b) **Map.** A moving map to be provided in a resizable window with the following facilities:-

- (i) Map to be synchronised both in position and scale to the video as per specified zoom.
- (ii) Display the current position and heading of the AV as an icon.
- (iii) There should be facilities to:-
 - (aa) Change between 3D and 2D view.
 - (ab) Annotate the map.

- (ac) Allow free movement (dragging) of the map, centre the map on the cameras ground track, centre the map on a specific area, see the map from the cameras point of view, fix the map so that it does not change with the movement of the AV and re-synchronise the map to the AV, as desired.
- (ad) Measure distance between ground points.
- (ae) Enlarge and reduce the map (Zoom in /out) upto 10X.

Data Link Frequency Management.

38. The Tac RPAS (RWI) should have a suitable uplink and downlink with the GCS in S/C Band (2 GHz to 6 GHz) secured with **256** bit AES encryption **or higher standards**. The transmission must be digital. The RPA should be scalable to alternate frequency as per Indian Army requirement at a subsequent stage.

39. Adequate channel spacing should be available between controlling channel frequencies (upward and down link) to enable interface free simultaneous ops from the same general area of operations. The frequencies available in the band width should not interfere with the frequencies of the existing systems.

40. The system should have the capability for selecting desired frequencies by the pilot.

41. The Data link system should provide the facility to create and embed an encryption layer. It should not be limited to preset/ pre-programmed spread spectrum sequences. The GCS should have the necessary interface to enable user to embed its coding layer on the RPAS Data link.

42. The antenna should automatically track the AV in flight.

43. There should be no mutual interference when two GCS operate in close vicinity of 1000 meters.

44. **Environment Conditions.** The RPAS and payload should be capable of satisfying the environmental requirements as specified in the relevant paragraphs of MIL-STD-810 G and JSS - 55555. The RPAS should withstand exposure to rainfall rate of 15 mm per hour.

(a) **Humidity.** 95% non-condensing at 40°C.

(b) **Operating temperature:-**

(i) Minimum : Between minus 20°C to minus 10°C.

(ii) Maximum : Between 40°C to 45°C.

(c) **Storage and Transportation temperature.** Minus 20°C to 55°C.

(d) **Wind Conditions.** Upto 25 Knots.

(e) **Rain Conditions.** 15mm per hour.

(f) Internal equipment to be ruggedized as per Mil-Std-810 G/JSS 55555. Tac RPAS RWI and its associated components should comply to the environmental parameters as laid down in Table 3-1 of JSS-55555.

(g) **Sand and Dust.** Comply with the requirement as per Mil-Std-810 G/JSS 55555.

(h) The Optoelectronic equipment (Day & Night) should comply to the relevant paragraphs of JSS-5855-11-2019 standards.

MAINTAINABILITY & ERGONOMIC PARAMETERS

45. **General.** The system should have minimum maintenance requirements and maintenance should be simple. The maintenance schedule of RPAS should ensure quick detection of causes of failure and replacement of faulty elements.

46. **Maintenance of Equipment.** The system should be modular in construction for ease of repair and maintenance. Air vehicle test/ check equipment should be provided to test out the gyroscope, engine and the electronic equipment of the vehicle, as well as the airframe. The compliance of compatibility of Electromagnetic Interference/ Electromagnetic Compatibility (EMI/ EMC) standards as per relevant paragraphs of MIL STD 461E/461F should be ensured. An analyser (similar to Flight Data Recorder) of in-flight behavior of the air vehicle should be provided should the air vehicle not function as required.

47. **BIT Facilities.**

- (a) Software based.
- (b) Capable of being run automatically and manually.
- (c) Capable of online and off-line functioning.
- (d) Generate reports in formats compatible with commercially available software.

DESIRABLE PARAMETERS

Nil

48. **Mandatory Requirements.** NO departure shall be made from these Preliminary Services Quality Requirements without the prior authority, in writing of Directorate of Standardisation/ DG CD/ADB.

49. **Review of PSQR.** As on required basis.

COMMERCIAL EVALUATION CRITERIA

1. **Name of the Vendor :** _____

2. **Evaluation Criteria.**

<u>S No</u>	<u>Criteria</u>	<u>Vendor Submission</u>	<u>Reference</u> (Reference against vendor / response must be flagged and mentioned in this column)
(a)	Nature of the Company (refer Para 6(b) of Chapter III of DAP-2020).	Indian / Joint Venture	
(b)	Ownership status (refer Para 20 (a) & (b) of Chapter I of DAP-2020).	Compliant / Non-compliant	
(c)	Category of Industry.	Large / Medium / Small / Micro / DPSU / Start Up	
(d)	Registration Details (as applicable for MSMEs – Udyam Registration Certificate, Start Ups – DPIIT Certificate and other – Registration Certificate (as applicable)).	Yes / No	
(e)	Minimum average turnover for last three financial years from date of issue of Eol.	_____ Cr.	
(f)	Net worth of previous financial year.	Positive / Negative	
(g)	Defence Industrial License details.	Yes/ Applied for	

Station :

Signature

Company Seal

Date :

Note :

- All submissions must be on printed copy of Appendix as uploaded on MoD website and should be supported by referenced documents duly authenticated.
- Any input with incorrect or missing reference will not be assessed.
- Conditional responses are not acceptable and are liable to be construed as Non-Compliant.

TECHNICAL EVALUATION CRITERIA

<u>Ser 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 48 weeks.	Compliant/ Non Compliant	
	(b) Delivery of 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 Appendix A (PSQR).	Compliant/ Non Compliant	
5.	Proposed system configuration (broad design details).	Provided/ Not provided	
6.	Acceptance to all terms and conditions given in the Eol.	Compliant/ Non Compliant	
<u>PSQR Requirements</u>			
7.	<u>Operational Parameters</u>		
	(a) <u>System Configuration.</u> The Tac RPAS (RWI) system should consist of the following sub-systems:-		
	(i) Aerial Vehicle (AV).	Compliant/ Non Compliant	
	(ii) Sensor package/ Payloads (Day and Night) and Airborne Data Relay (ADR).	Compliant/ Non Compliant	
	(iii) Ground Control Station (GCS) to include power source/generator.	Compliant/ Non Compliant	
	(iv) Remote Video Terminals (RVT).	Compliant/ Non Compliant	
	(v) Inter and intra communication system.	Compliant/ Non Compliant	
	(vi) Facility to transmit imagery in real time/ near real time to the end user in the industry standard formats used by the three services.	Compliant/ Non Compliant	

<u>Ser No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>
	(b) Compliance of Metric System. The proposed Tac RPAS (RWI) will use 'SI' or 'SI derived' units.	Compliant/ Non Compliant	
	(c) Maps. The system should be compatible with the following:-		
	(i) The application should be compliant to operate Maps produced in WGS 84 Datum and LCC Projection (Two Standard Parallel) based on the under mentioned User defined parameters: -	Compliant/ Non Compliant	
	(aa) Central Meridian (Origin of Longitude).	Compliant/ Non Compliant	
	(ab) Origin of Latitude.	Compliant/ Non Compliant	
	(ac) False Easting.	Compliant/ Non Compliant	
	(ad) False Northing.	Compliant/ Non Compliant	
	(ae) Standard Parallel 1.	Compliant/ Non Compliant	
	(af) Standard Parallel 2.	Compliant/ Non Compliant	
	(d) Secure admin based user interface must be provided for entering the above mentioned parameter values.	Compliant/ Non Compliant	
	(e) Application must be compliant to Geo Tiff map file formats and Digital Elevation Model (DEM) data for elevation as an input.	Compliant/ Non Compliant	
	(f) The application should also be capable to ingest Shape file format.	Compliant/ Non Compliant	
	(g) Geo Reference. (i) Indian Military Grid Reference should be based on Defence Series Maps (DSM) and the equipment display console should be able to simultaneously read out 10 figure Grid Reference as well as Geographical coordinates in degree-minutes-seconds format.	Compliant/ Non Compliant	

<u>Ser No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>
	(ii) The parameters mentioned in Paragraph 16 (a) above once fed should not be displayed/visualised anywhere in software system besides the admin console and must be stored in an encrypted form.	Compliant/ Non Compliant	
	(iii) Provision to only update/modify/ delete the parameters should exist.	Compliant/ Non Compliant	
	<u>Performance Parameters</u> (h). <u>Launch and Recovery.</u> The Tac RPA (RWI) should be possible to launch and recover from within an unprepared designated area of 50m x 50m.	Compliant/ Non Compliant	
	(j) <u>Design and Construction.</u> (i) The Tac RPAS (RWI) should be capable of Vertical Take Off and Landing(VTOL) or Catapult launch.	Compliant/ Non Compliant	
	(ii) The Aerial Vehicle (AV) and the payloads should be modular in design.	Compliant/ Non Compliant	
	(iii) The Tac RPAS (RWI) should have low radar signature of $\leq 01 \text{ m}^2$.	Compliant/ Non Compliant	
	(k) <u>Altitude (With Payload).</u> (i) Operating Altitude : Upto 4000 M (13000ft) Above Mean Sea Level.	Compliant/ Non Compliant	
	(ii) Altitude Ceiling : Upto 5000 M (16000 ft) above Mean Sea Level.	Compliant/ Non Compliant	
	(l) <u>Endurance.</u> With maximum All Up Weight (AUW) should be 6 hrs or more (from take-off to landing).	Compliant/ Non Compliant	
	(m) <u>Operating Range (At all Operating Altitude).</u> The direct Line of Sight control range from GCS should be minimum 80Km.	Compliant/ Non Compliant	

<u>Ser No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>
	<p>(n) <u>Speed (for mid fuel weight).</u></p> <p>(i) Maximum Speed : 100 Km/h or more. (ii) Operating Speed : Upto 60 - 100 Km/h.</p>	Compliant/ Non Compliant	
	<p>(o) <u>System Accuracy.</u> The target acquisition accuracy for targets during flight should be better than 50 meter (CEP).</p>	Compliant/ Non Compliant	
	<p>(p) <u>Navigation System.</u></p> <p>(i) The system should be compatible with GPS, GLONASS and IRNSS.</p>	Compliant/ Non Compliant	
	<p>(ii) <u>Geo Co- Ordinate Accuracy.</u> GPS, GLONASS and IRNSS based accuracy of geo reference co-ordinates should be 50 meter or better.</p>	Compliant/ Non Compliant	
	<p>(q) <u>Mission Capabilities.</u></p> <p>(i) <u>Target Acquisition.</u> The Tac RPA (RWI) should be capable of target acquisition by day and night. The RPAS should be equipped with sensors to enable transmission of MWIR and CCD camera imagery pictures of High Definition (HD) resolution. The system must be able to detect, track, recognise and identify the targets.</p>	Compliant/ Non Compliant	
	<p>(ii) <u>Real Time Engagement of Targets.</u> Once a target has been acquired, the AV sensors should have the capability of 'locking on' to the target and determine impact of incoming shells/ rockets. The GCS computer should have the capability to provide the data to correct the mean point of impact of these rockets/ shells, on to the target. This capability should be both day and night. It should also enable damage assessment once the target has been engaged.</p>	Compliant/ Non Compliant	

Ser No	Criteria and Sub Criteria	Vendor Response	Remarks (if Any)
	(iii) Integration Capability. The RPAS should be capable of providing output of relevant data through Remote Video terminal (RVT).	Compliant/ Non Compliant	
	(iv) Payload. The system should be capable of operating the Electro Optical (EO) Payloads. The Electro Optical (EO) Payloads system to carry EO payload viz CCD and MWIR for day and night missions. CCD should have switchable panoramic mode.	Compliant/ Non Compliant	
8.	<u>TECHNICAL PARAMETERS</u>		
	(a) Aerial Vehicle (AV).		
	(i) Features. Essential features of the AV are as follows:-	Compliant/ Non Compliant	
	(aa) An on board auto pilot to control the AV.	Compliant/ Non Compliant	
	(ab) The airframe should be constructed with lightweight composite material to facilitate low Radar Cross Section (RCS) of $\leq 01 \text{ m}^2$.	Compliant/ Non Compliant	
	(ac) The design of the airframe should be modular to facilitate containerisation transportation in service transport.	Compliant/ Non Compliant	
	(ad) The design and the geometry of the fuselage should ensure variety of single or multiple payloads for day and night operations.	Compliant/ Non Compliant	
	(b) Flight Modes. The AV should be able to operate in the following flight modes:-	Compliant/ Non Compliant	
	(i) Fully Autonomous Mode. Follow a pre-programmed flight path. Dynamic re-programming of the flight path must be possible.	Compliant/ Non Compliant	
	(ii) Semi-Autonomous Mode. Control of heading, air speed and altitude of the AV by the operator with other parameters being controlled by the autopilot.	Compliant/ Non Compliant	

Ser No	Criteria and Sub Criteria	Vendor Response	Remarks (if Any)
	(iii) <u>Loiter Mode.</u> Fly around a fixed point in minimum two patterns (Selectable radius circle and figure of eight).	Compliant/ Non Compliant	
	(iv) <u>Target Seeking Mode.</u> Keep camera locked on to a fixed/moving target.	Compliant/ Non Compliant	
	(v) <u>Camera Guide Mode.</u> Follow a locked on moving target.	Compliant/ Non Compliant	
	(vi) <u>Manual Mode.</u> Used in case the pilot physically needs to control the AV for maneuvering (in case of autopilot failure or manual override).	Compliant/ Non Compliant	
	(vii) <u>Return Home Mode.</u> In case during the flight there is a break in communication (duration defined by the user) the AV should automatically change to 'Return to Home' mode. The route for Return to Home mode should be programmable by the user before the mission and capable of being updated during the mission. The AV should land at either the take-off location or a pre-selected way - point (user defined).	Compliant/ Non Compliant	
	(c) <u>Structural Integrity.</u> The airframe should last for at least 4000 flying hours or sustain not less than 1500 landings whichever is earlier.	Compliant/ Non Compliant	
	(d) <u>Propulsion and Power Systems.</u> (i) <u>Engine.</u> Engine noise should not be audible at ground when it is flying 1000m Above Ground Level (AGL). The decibel level at 100 meter Above Ground Level (AGL) should be ≤ 60 dBA.	Compliant/ Non Compliant	
	(ii) <u>Fuel System.</u> The AV should carry fuel for the maximum endurance as specified. A single point refueling should be possible. During flight, fuel management should ensure minimum shift of centre of gravity as the fuel is consumed.	Compliant/ Non Compliant	

Ser No	Criteria and Sub Criteria	Vendor Response	Remarks (if Any)
	(iii) Power Supply. Engine driven alternators and batteries should supply electrical power to all on board systems. Necessary margin of at least 30% of the total power for redundancy and protection devices should be provided. The batteries should cater for back of 90 minutes to recover the RPAS safely in case of generator/ alternator failure.	Compliant/ Non Compliant	
	(e) Payloads. The system should cater for operation of Electro Optical Payloads: - (i) Optical Sensor (Day Video Camera, Night Camera, Medium Wave Infra-Red (MWIR) Camera and Laser Range Finder (LRF). The RPAS should have established Gimbal Payload Assembly (GPA) to house the CCD camera (colour), MWIR and Laser Range Finder (LRF). The GPA should have different modes of operation like position mode, search mode and track mode:-	Compliant/ Non Compliant	
	(aa) The optical sensor should provide output in a digital format and housed on a Gimbal Payload Assembly (GPA) providing stabilisation with pointing accuracy of 15 minutes ($1/4^0$) and jitter isolation of 30 micro radian.	Compliant/ Non Compliant	
	(ab) GPS/GLONASS/IRNSS and inertial Measurement Unit data should be integrated with the data from the sensors.	Compliant/ Non Compliant	
	(ac) It should be capable of being panned to 360^0 (continuous) and have angular coverage from $+10^0$ to -60^0 in elevation.	Compliant/ Non Compliant	
	(ad) The optical sensors should be capable of taking still images.	Compliant/ Non Compliant	

Ser No	Criteria and Sub Criteria	Vendor Response	Remarks (if Any)																		
	<p>(ae) The minimum observation ranges (slant ranges) to be achieved under clear weather conditions are:-</p> <table border="1" data-bbox="487 354 1390 659"> <thead> <tr> <th>Sensor</th> <th>Detection</th> <th>Recognition</th> <th>Identification</th> <th>Target Size</th> <th>Sensor Altitude</th> </tr> </thead> <tbody> <tr> <td>CCD Camera</td> <td>15 Km</td> <td>15 Km</td> <td>05 Km</td> <td>2.3x 2.3 m</td> <td>3000 m AGL. Payload should perform at higher altitudes as long as the target is within the sensor slant range capability</td> </tr> <tr> <td>MWIR</td> <td>10 Km</td> <td>05 Km</td> <td>03 Km</td> <td></td> <td></td> </tr> </tbody> </table>	Sensor	Detection	Recognition	Identification	Target Size	Sensor Altitude	CCD Camera	15 Km	15 Km	05 Km	2.3x 2.3 m	3000 m AGL. Payload should perform at higher altitudes as long as the target is within the sensor slant range capability	MWIR	10 Km	05 Km	03 Km			Compliant/ Non Compliant	
Sensor	Detection	Recognition	Identification	Target Size	Sensor Altitude																
CCD Camera	15 Km	15 Km	05 Km	2.3x 2.3 m	3000 m AGL. Payload should perform at higher altitudes as long as the target is within the sensor slant range capability																
MWIR	10 Km	05 Km	03 Km																		
	<p>(af) <u>Colour Day Video Camera.</u></p> <p>(afa) Be capable of providing real time video from the day sensor of minimum 1280 x 780 pixels' resolutions at not less than 20 frames per second.</p>	Compliant/ Non Compliant																			
	<p>(afb) Have a 30X or higher continuous optical zoom.</p>	Compliant/ Non Compliant																			
	<p>(ag) <u>Night Camera.</u></p> <p>(aga) Provide real time video of minimum 640 x 480 pixels' resolutions at not less than 20 frames per second.</p>	Compliant/ Non Compliant																			
	<p>(agb) Enable reversing the polarity of the display i.e. white hot and black hot.</p>	Compliant/ Non Compliant																			
	<p>(ah) <u>LRF.</u> Maximum range of 20 Kilometer.</p>	Compliant/ Non Compliant																			
	<p>(f) <u>Security.</u></p> <p>(i) A security mechanism should be provided to detect and prevent unauthorised alteration of input or transmitted data.</p>	Compliant/ Non Compliant																			
	<p>(ii) It should have the capability of Anti Jamming / Anti Spoofing.</p>	Compliant/ Non Compliant																			
	<p>(g). <u>Permissible Initialisation Period.</u> The initialisation should be operational within ten minutes of switching on.</p>	Compliant/ Non Compliant																			

Ser No	<u>Criteria and Sub Criteria</u>	Vendor Response	Remarks (if Any)
9.	<u>Ground Control Station (GCS).</u>		
	(a) <u>Features of GCS.</u> The GCS should be ruggedized and of modular design and capable of rapid deployment the GCS should be vehicle based. The design characteristics of the GCS should offer very friendly man-machine interface, and software programmable with cockpit like human factors. The GCS should feature necessary aids for planning, controlling and monitoring of complete RPAS mission as under:-		
	(i) Carry out diagnostic tests on AV, payload and communication data links. There should be a self-test facility for the GCS.	Compliant/ Non Compliant	
	(ii) Mission planning capability prior to commencement of flight and alteration to autonomous flight plan/ way points during mission.	Compliant/ Non Compliant	
	(iii) Display of all parameter essential for AV controller.	Compliant/ Non Compliant	
	(iv) Electronic map display with provision for selection of scales.	Compliant/ Non Compliant	
	(v) Record AV flight parameter during mission.	Compliant/ Non Compliant	
	(vi) Necessary man-machine interface for the AV operator and payload operator.	Compliant/ Non Compliant	
	(vii) Should have storage capacity of 1.0 Terabyte and UPS backup for 30 minutes.	Compliant/ Non Compliant	
	(viii) Payload operation with image exploitation facility, target acquisition, target coordinate computation.	Compliant/ Non Compliant	
	(ix) Post mission analysis and target folder generation.	Compliant/ Non Compliant	
	(x) Image recording on CD/DVD facility.	Compliant/ Non Compliant	
	(xi) The software should comply to the relevant paragraphs of IEEE-12207 standards.	Compliant/ Non Compliant	

<u>Ser No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>
	(xii) <u>Pilot-Observer Function.</u> It is desirable to have modular & user friendly system for control of EO& MWIR payload during missions. It should include following:-		
	(aa) Switching on/off sensor (TV/MWIR).	Compliant/ Non Compliant	
	(ab) Selecting Field of View (FoV).	Compliant/ Non Compliant	
	(ac) Mode selection (Rate, position, track point to window etc).	Compliant/ Non Compliant	
	(ad) Zooming.	Compliant/ Non Compliant	
	(ae) Real time image processing for target acquisition.	Compliant/ Non Compliant	
	(xiii) <u>Mission Planning Function.</u> For planning, controlling and monitoring the RPAS mission with a digital map display, the system should ensure the following:-	Compliant/ Non Compliant	
	(aa) <u>Creating a Mission Plan.</u> Mission plan segments attributes to include altitude, speed, position, payload control and data link control.	Compliant/ Non Compliant	
	(ab) Provision for up-loading mission plan into RPAS prior to flight and modifying it while in flight.	Compliant/ Non Compliant	
	(ac) Capability to handle maps of different scales.	Compliant/ Non Compliant	
	(ad) DSM compatible.	Compliant/ Non Compliant	
	(ae) Computation and display of:-	Compliant/ Non Compliant	
	(aea) RPA location and track.	Compliant/ Non Compliant	
	(aeb) Target location.	Compliant/ Non Compliant	
	(aec) Sensor field of view.	Compliant/ Non Compliant	
	(aed) Data link coverage.	Compliant/ Non Compliant	
	(af) Video recording and playback facility.	Compliant/ Non Compliant	

Ser No	Criteria and Sub Criteria	Vendor Response	Remarks (if Any)
10.	Display. The GCS should:-		
	(a) Display. High Definition, sunlight readable to display imagery of all Electro Optic sensors. (i) Screen Size : ≥ 15 inches. (ii) Operating system: Windows X/ latest version. (iii) Processor : \geq i5 with Quad Core.	Compliant/ Non Compliant	
	(b) Video. Display User selectable flight and mission information as an overlay on top of the video and save it for future debriefing. The mission information should include: - (i) Coordinates of the target. (ii) Altitude of target above Mean Sea Level. (iii) AV Position. (iv) Height of AV above ground level. (v) Distance of AV from GCS (vi) Distance of AV from target. (vii) Mission Time. (viii) Time of imagery. (ix) North arrow.	Compliant/ Non Compliant Compliant/ Non Compliant Compliant/ Non Compliant Compliant/ Non Compliant Compliant/ Non Compliant Compliant/ Non Compliant Compliant/ Non Compliant Compliant/ Non Compliant	
	(c) Map. A moving map to be provided in a resizable window with the following facilities. (i) Map to be synchronised both in position and scale to the video as per specified zoom. (ii) Display the current position and heading of the AV as an icon.	Compliant/ Non Compliant Compliant/ Non Compliant	

Ser No	Criteria and Sub Criteria	Vendor Response	Remarks (if Any)
	(iii) There should be facilities to:- (aa) Change between 3D and 2D view.	Compliant/ Non Compliant	
	(ab) Annotate the map.	Compliant/ Non Compliant	
	(ac) Allow free movement (dragging) of the map, centre the map on the cameras ground track, centre the map on a specific area, see the map from the cameras point of view, fix the map so that it does not change with the movement of the AV and re synchronise the map to the AV, as desired.	Compliant/ Non Compliant	
	(ad) Measure distance between ground points.	Compliant/ Non Compliant	
	(ae) Enlarge and reduce the map (Zoom in /out) upto 10X.	Compliant/ Non Compliant	
11.	<p><u>Remote Video Terminal (RVT)</u></p> <p>(a) The RVT should be capable of being remotely located within the communication range of the AV of minimum 20 Km and be tuned to the AV's downlink frequency. It should be ruggedized portable computer based with a resolution of minimum 1280 x 780 pixels, screen size of \geq 13 inches and have the following facilities:-</p> <p>(i) Simultaneous display of live video and a synchronised moving map in resizable windows in real time.</p> <p>(ii) Record and replay the optical sensor output, telemetry and mission flight data. A solid State Disk (SSD) of minimum 1 TB must be provided.</p> <p>(iii) Provide video freeze frames (Snapshots) and video clippings of the live feed from the optical sensors. Suitable software should be provided for subsequent annotation of the extracted snapshot/ video clipping with icons provided by the vendor.</p>	Compliant/ Non Compliant	

Ser No	Criteria and Sub Criteria	Vendor Response	Remarks (if Any)
	(iv) Upload digital maps from an external CD/DVD/ Hard disk.	Compliant/ Non Compliant	
	(v) Cater for minimum of 8 hours of continuous operations with an additional minimum 8 hours spare battery for back up provided.	Compliant/ Non Compliant	
	(vi) Provide video output through an HDMI port.	Compliant/ Non Compliant	
12.	<u>Display.</u> The RVT should:-		
	(a) <u>Video.</u> Display User selectable flight and mission information as an overlay on top of the video and save it for future debriefing. The mission information should include:-	Compliant/ Non Compliant	
	(i) Coordinates of the target.		
	(ii) Altitude of target above Mean Sea Level.	Compliant/ Non Compliant	
	(iii) AV Position.	Compliant/ Non Compliant	
	(iv) Height of AV above ground level.	Compliant/ Non Compliant	
	(v) Distance of AV from RVT.	Compliant/ Non Compliant	
	(vi) Bearing (Azimuth) of AV from RVT.	Compliant/ Non Compliant	
	(vii) Mission Time.	Compliant/ Non Compliant	
	(viii) North arrow.	Compliant/ Non Compliant	
	(ix) Time of imagery.	Compliant/ Non Compliant	
	(x) Communication link status.	Compliant/ Non Compliant	
	(b) <u>Map.</u> A moving map to be provided in a resizable window with the following facilities:-		
	(i) Map to be synchronised both in position and scale to the video as per specified zoom.	Compliant/ Non Compliant	
	(ii) Display the current position and heading of the AV as an icon.	Compliant/ Non Compliant	

Ser No	Criteria and Sub Criteria	Vendor Response	Remarks (if Any)
	(iii) There should be facilities to:-		
	(aa) Change between 3D and 2D view.	Compliant/ Non Compliant	
	(ab) Annotate the map.	Compliant/ Non Compliant	
	(ac) Allow free movement (dragging) of the map, centre the map on the cameras ground track, centre the map on a specific area, see the map from the cameras point of view, fix the map so that it does not change with the movement of the AV and re-synchronise the map to the AV, as desired.	Compliant/ Non Compliant	
	(ad) Measure distance between ground points.	Compliant/ Non Compliant	
	(ae) Enlarge and reduce the map (Zoom in /out) upto 10X.	Compliant/ Non Compliant	
13.	<u>Data Link Frequency Management.</u>		
	(a) The Tac RPAS (RWI) should have a suitable uplink and downlink with the GCS in S/C Band (2 GHz to 6 GHz) secured with 256 bit AES encryption or higher standards . The transmission must be digital. The RPA should be scalable to alternate frequency as per Indian Army requirement at a subsequent stage.	Compliant/ Non Compliant	
	(b) Adequate channel spacing should be available between controlling channel frequencies (upward and down link) to enable interface free simultaneous ops from the same general area of operations. The frequencies available in the band width should not interfere with the frequencies of the existing systems.	Compliant/ Non Compliant	
	(c) The system should have the capability for selecting desired frequencies by the pilot.	Compliant/ Non Compliant	

Ser No	Criteria and Sub Criteria	Vendor Response	Remarks (if Any)
	(d) The Data link system should provide the facility to create and embed an encryption layer. It should not be limited to preset/ pre-programmed spread spectrum sequences. The GCS should have the necessary interface to enable user to embed its coding layer on the RPAS Data link.	Compliant/ Non Compliant	
	(e) The antenna should automatically track the AV in flight.	Compliant/ Non Compliant	
	(f) There should be no mutual interference when two GCS operate in close vicinity of 1000 meters.	Compliant/ Non Compliant	
	(g) <u>Environment Conditions.</u> The RPAS and payload should be capable of satisfying the environmental requirements as specified in the relevant paragraphs of MIL-STD-810 G and JSS - 55555. The RPAS should withstand exposure to rainfall rate of 15 mm per hour.	Compliant/ Non Compliant	
	(i) <u>Humidity.</u> 95% non-condensing at 40°C.	Compliant/ Non Compliant	
	(ii) <u>Operating temperature:-</u>	Compliant/ Non Compliant	
	(aa) Minimum : Between minus 20°C to minus 10°C.	Compliant/ Non Compliant	
	(ab) Maximum : Between 40°C to 45°C.	Compliant/ Non Compliant	
	(h) <u>Storage and Transportation temperature.</u> Minus 20°C to 55°C.	Compliant/ Non Compliant	
	(j) <u>Wind Conditions.</u> Upto 25 Knots.	Compliant/ Non Compliant	
	(k) <u>Rain Conditions.</u> 15mm per hour.	Compliant/ Non Compliant	
	(l) Internal equipment to be ruggedized as per Mil-Std 810 G/JSS 55555. Tac RPAS RWI and its associated components should comply to the environmental parameters as laid down in Table 3-1 of JSS-55555.	Compliant/ Non Compliant	

Ser No	Criteria and Sub Criteria	Vendor Response	Remarks (if Any)
	(m) Sand and Dust. Comply with the requirement as per Mil-Std-810 G/JSS 55555.	Compliant/ Non Compliant	
	(n) The Optoelectronic equipment (Day & Night) should comply to the relevant paragraphs of JSS-5855-11-2019 standards.	Compliant/ Non Compliant	
14.	<u>Maintainability & Ergonomic Parameters.</u>		
	(a) <u>Maintenance of Equipment.</u> The system should be modular in construction for ease of repair and maintenance. Air vehicle test/ check equipment should be provided to test out the gyroscope, engine and the electronic equipment of the vehicle, as well as the airframe. The compliance of compatibility of Electromagnetic Interference/ Electromagnetic Compatibility (EMI/ EMC) standards as per relevant paragraphs of MIL STD 461E/461F should be ensured. An analyser (similar to Flight Data Recorder) of in-flight behavior of the air vehicle should be provided should the air vehicle not function as required.	Compliant/ Non Compliant	
	(b) <u>BIT Facilities.</u>	Compliant/ Non Compliant	
	(i) Software based.	Compliant/ Non Compliant	
	(ii) Capable of being run automatically and manually.	Compliant/ Non Compliant	
	(iii) Capable of online and off-line functioning.	Compliant/ Non Compliant	

Ser No	Criteria and Sub Criteria	Vendor Response	Remarks (if Any)
	(iv) Generate reports in formats compatible with commercially available software.	Compliant/ Non Compliant	
15.	Correctness Certificate	Yes/No	
16.	Confidentiality Agreement	Yes/No	
17.	Eol Compliance Certificate	Yes/No	
18.	Information Performa	Yes/No	

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 be assessed.

CORRECTNESS CERTIFICATE

It is certified that information submitted in the documents as part of the response to Expression of Interest for the project of Tactical Remotely Piloted Aircraft System (Runway Independent) 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 be assessed.

CONFIDENTIALITY AGREEMENT

1. It is certified that Expression of Interest document for the project of Tactical Remotely Piloted Aircraft System (Runway Independent) 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 be assessed.

EoI COMPLIANCE CERTIFICATE

It is certified that all the aspects mentioned in the Expression of Interest for the procurement of Tactical Remotely Piloted Aircraft System (Runway Independent) 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 be assessed.

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. Nature of Business (Manufacture / Trader / Sole selling or Authorised Agent/ Dealer / Assembler / Processor / Re packer/ Service Provider). Please give broad product range as applicable
11. Details of Current Products :-
 - (a) Type / Description.
 - (b) Licensed / Installed Capacity.
 - (c) Annual Production for Preceding 3 Years.
12. Credit Rating.
13. Details of IPRs if any.
14. Details of Foreign Collaborations if any planned for execution of project.
15. Technology Received from abroad and assimilated / planned for execution of project.

16. 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.
17. 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.
18. Turn-Over during the last Three Financial Years.
19. Assistance required from IA/User Dte during prototype development.
20. Any other relevant information.
21. 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 :