MINISTRY OF DEFENCE THROUGH THE PROJECT DIRECTOR OF ITS GREENAI PROJECT MANAGEMENT UNIT ("PROCURING AGENCY")

INVITATION TO BIDS

NASTP-GREENAI-HW-ACAST/05/2026

FOR

DESIGN & DEVELOPMENT OF UAS-ASMS HARDWARE PHASE II

AS A COMPONENT OF PSDP APPROVED PROJECT TITLED "DEVELOPMENT OF ICT AND ARTIFICIAL INTELLIGENCE (AI) BASED PRECISION AGRICULTURE SYSTEMS UTILIZING DUAL-USE AEROSPACE TECHNOLOGIES - GREEN-AI"

Issue Date:18 March, 2026

1. The procuring agency invites sealed bids from Firms, companies, distributers / suppliers registered with Income Tax and Sales Tax Department for Design and Development UAS-ASMS Hardware Phase II.

2. A complete set of bidding documents, containing detailed terms and conditions are available for the interested bidders at Project GreenAI NASTP, Alpha-19, Old Airport Road, Rawalpindi. Price of bidding documents is Rs.1000/-. Bidding documents may also be downloaded from PPRA's website. Bids prepared in accordance with instructions in the bidding document must reach at following address Project GreenAI, NASTP Alpha-19, Old Airport Road, Rawalpindi on or before 08 April, 2026 at 11:00 am. Bids will be opened on same day 08 April, 2026 at 11:30 am in presence of bidders or their authorized representatives. The advertisement along with bidding document is also available on PPRA web address www.ppra.org.pk.

Project Director (GreenAI)
NASTP, Alpha 19,
Old Airport Road, Rawalpindi
pd@greenai.org.pk

Date: - 18 March, 2026

PLEASE READ CAREFULLY

- Participating bidders are required to submit bids according to instructions mentioned in bidding documents. These bids should meet the requirements/criteria illustrated in bidding documents along with fulfillment of other terms and conditions of tenders.

- According to rule 31 of Public Procurement Rules, 2004 ("PPR 2004") no bidder is allowed to alter or modify his bids after the bids have been opened. Moreover, as per rule 36 (b)(vi) of PPR 2004, no amendment in the technical proposal is permitted during technical evaluation. Therefore, in the light of prevailing Govt. procedures, requests for amendments in quotations and clarifications leading to change of substance of bid after opening of bids cannot be accepted and bids not conforming to tender requirements are liable to be rejected.

- Participating bidders are therefore requested to read the bidding documents thoroughly and submit their quotes accordingly without any condition in conformance to all tender requirements including Down Payment, bid validity, provisioning of original quotation from foreign principal, Bank Guarantee confirmation etc., for consideration of bid. Bid found non-conforming to tender requirements is liable to be rejected on tender opening date.

- **Participating firms are requested to provide particulars of their reps on Cell No 03244411999/03244447655 at least 01 day prior to a tender opening Date**.

DISCLAIMER

All information provided/ clarified in this Request for Proposal (RFP) is in the best interest and faith of the parties involved. This RFP is neither an agreement nor an offer/ invitation of agreement by the procuring agency to the prospective bidders or any other person. The purpose of this RFP is to provide interested parties with information that may be useful to them in the formulation of their proposals pursuant to this RFP. The information published in this document is not intended to be exhaustive. Though adequate care has been taken in the presentation of this RFP document, the assumptions, assessments, statements, and information contained in this RFP, may not be complete, accurate, adequate, or correct. Interested bidders shall, therefore, required to make their own investigations and assumptions wherever required and satisfy themselves that the RFP document is complete in all respects. Intimation of discrepancy, if any, should be given to the specified office immediately. If no intimation is received by the office till the date mentioned in the document, it shall be deemed that the RFP document is complete in all respects and parties submitting their proposals are satisfied that the RFP document is complete in all respects.

Information provided in this document or imparted to any respondent as part of RFP process is confidential to the procuring agency and shall not be used by the bidders for any other purpose, distributed to, or shared with any other person or organization.

ABBREVIATIONS

ACK	Acknowledgment
ASMS	Air Space Management System
C2 Center	Command and Control Center
CAD	Computer Aided Design
CDR	Critical Design Review
GCS	Ground Control Station
GSM	Global System for Mobile communications
GRC	Grievances Redressal Committee
LoA	Letter of Acceptance
NDA	Non Disclosure Agreement
OEM	Original Equipment Manufacturer
PG	Performance Guarantee
POC	Proof of Concept
RFP	Request for Proposal
RTB	Return to Base
RTK	Real Time Kinematics
SATCOM	Satellite Communications
UAV	Unmanned Aerial Vehicle
UAS	Unmanned Aircraft System

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LIST OF CLAUSES AND ANNEXURES GENERAL PARTICULARS

BIDDING PROCESS INSTRUCTIONS

1. **Bid Reference No.** NASTP-GREENAI-HW-ACAST/05/2026
2. **Procurement Agency**

   Ministry of Defense through the Project Director of its Green-AI Project Management Unit.
3. **Invitation of Bid**

   PMU GREENAI invites sealed bids for DESIGN & DEVELOPMENT OF UAS-ASMS HARDWARE PHASE II.
4. **Pre-bid Meeting**

   To clarify any ambiguity / lack of understanding before submission of final bids, a meeting may be planned for convenience of bidders on i.e. **30 March, 2026 at 02:30 PM at NASTP Alpha-19, Old Airport Road, Rawalpindi**. Participating firms are requested to provide particulars of their reps on Ph. No. 03244411999 / **03244447655** at least one (01) day prior to tender opening date and the pre-bid meeting date for necessary arrangements. The bidders' representatives should attend, at their own cost, expense and arrangement (including obtaining visas and travel documents, if required), the meeting(s) to obtain clarifications and any other information required for preparation of the Bid. Moreover, the procuring agency may organize more than one (01) pre-bid meeting.
5. **Last Date & Time of Submission of Bid:** 08 April, 2026 at 1100hrs
6. **Bid Opening Date & Time:** 08 April, 2026 at 1130hrs
7. **Bid Opening Address**

   Project Management Unit (PMU), Project GreenAI, NASTP, Alpha 19, Old Airport Road, Rawalpindi.

   Tel: 0324-4411999 / 03244447655

   Email: sm_scm@greenai.org.pk
8. **General Instructions to Bidders**

   (a) The bidder shall bear all its costs associated with or relating to the preparation and submission of its Proposal including but not limited to preparation, copying, postage, delivery fees, expenses associated with any demonstrations or presentations which may be required by the procuring agency, or any other costs incurred in connection with or relating to its Proposal.

   (b) The procuring agency reserves the right to reject any or all of the bids submitted in response to this RFP document at any stage without assigning any reasons whatsoever. The procuring agency also reserves the right to withhold or withdraw the process at any stage with intimation to all who have submitted their proposals in response to this RFP.

   (c) Any time prior to the deadline for submission of bids, the procuring agency may change/ modify/ amend any or all of the provisions of this RFP document without assigning any reason. All addenda/ corrigenda shall form part of the RFP documents and shall be notified in writing to all prospective bidders and will be binding on them. The prospective bidders should acknowledge receipt of any such addendum/ amendment in the RFP document(s).

   (d) The Bidder may modify or withdraw its Bid after the Bid submission but prior to deadline for submission of the Bids, provided that written notice of the modification or withdrawal is received by procuring agency.

(e) No Bid may be modified subsequent to the deadline for submission of the Bids.

(f) No Bid may be withdrawn in the interval between the deadline for submission of Bids and the expiry of the period of Bid validity specified by the Bidder on the Bid Form. Withdrawal of a Bid during this interval may result in forfeiture/encashment of the Bid Security.

9. **Procurement Procedure:** The procuring agency is adopting a 'single stage-two envelope' bid procedure as specified in rule 36(b) of PPR 2004.

10. **Language of Bid:** The Bid prepared by the bidder and all correspondence and documents relating to the Bid exchanged between the Bidder and procuring agency and/ or any representative of procuring agency, shall be written in English language. Any supporting printed literature furnished by the Bidder written in another language should be accompanied by an English translation of its pertinent pages in which case, for purposes of interpretation of the Bid, the English translation shall govern**.**

11. **Submission of Proposals**

(i) Proposals are to be submitted as hard copy via post or by-hand sealed as under.

(ii) The Bid shall comprise a single package containing two (02) separate envelopes. Each envelope shall contain separately the technical proposal and the financial proposal.

(iii) Technical **Proposal:** Technical proposal is to be submitted in **duplicate** in a separate sealed envelope and clearly marked **"Technical Proposal without prices",** Tender number and date of opening. The Technical Proposal Envelope shall contain: -

- Technical Proposal as per System Requirement Specifications **Annexure 'A'**
- Bidding Forms & **Annexure 'D' to Annexure 'F'** (Duly filled & signed by authorized signatory)
- Bid Security in a separate sealed envelope clearly marked **Bid Security,** Tender Number.
- Soft copy of Technical Proposal in the form of USB in a separate sealed envelope clearly marked **"Soft Copy of Technical Proposal",** Tender Number.

(iv) **Financial Proposal:** It shall contain Financial Proposal Form **Annexure 'C'** filled and dully signed in a separate sealed envelope clearly marked on the face **"Financial Proposal with prices",** tender number.

(v) Both the **"Envelopes"** of Technical and Financial proposals should be enclosed in one cover, properly sealed, and bear the address of procuring agency with tender number and opening date.

(vi) Failure to provide any of the required information specified in the RFP document with the 'Technical Proposal' (Envelope 1), and in the prescribed format (where applicable), may lead to disqualification of the Bid and the affected Bidder's 'Financial Proposal' (Envelope 2) will be returned unopened.

(vii) The procuring agency reserves the right to verify the letters, documents or information provided by any bidder from issuing parties and may (together with its advisers) visit and hold meetings with them which shall be facilitated by the bidder. Furthermore, failure to provide the Financial Proposal in the form required under this RFP document may also result in disqualification of the Bid.

12. **Evaluation Process**

(a) The procuring agency intends to exercise the most advantageous bid in conformance with PPR 2004.

(b) The Bid shall comprise a single package containing two (02) separate envelopes. Each envelope shall contain separately the technical proposal and the financial proposal.

(c) The envelopes shall be marked clearly as “TECHNICAL PROPOSAL” and “FINANCIAL PROPOSAL” in bold and legible letters to avoid confusion.

(d) Initially, only the envelope marked “TECHNICAL PROPOSAL” shall be opened.

(e) The envelope marked as “FINANCIAL PROPOSAL” shall be retained in the custody of the procuring agency without being opened.

(f) Procuring agency shall evaluate the technical proposal in the manner prescribed herein, without reference to the price and reject any proposal which does not conform to the specified requirements.

(g) During the technical evaluation no amendments in the technical proposal shall be permitted.

(h) Technical Qualification evaluation shall be based on the criteria given in **Annexure ‘B’ Evaluation Criteria**, regarding Bidder’s Technical Experience, Product Capabilities, Design Process and Solution Presentation, etc. as demonstrated in the qualification documents submitted by the Bidder.

(i) The Bidders securing **at least seventy percent (70%)** overall marks and minimum passing marks in each category (i.e., Technical Capability, Product Capabilities, Design Process, Airborne Ready Solutions, Solution Presentation and Flight Demonstration), in addition to the fulfilment of mandatory requirements, shall be considered qualified, and assigned a technical score **S*t***.

(j) Financial bids of only the technically qualified bidders shall be opened and assigned a financial score **S*f*** evaluated by procurement committee as per the formula described in **Annexure “B”**.

(k) Work will be awarded to the bidder offering most advantageous bid evaluated as the highest ranked bid based on cost and quality as described in **Annexure “B”**.

(l) Prior to the expiration of the period of bid validity, procuring agency will notify the successful bidder in writing of its intent to award the contract. The contract will be executed subject to satisfactory discussion of the terms and conditions of the contract. The discussion shall be in accordance with PPR 2004 provisions of Pakistan. The form of contract is attached as **Annexure ‘G’**.

(m) Upon the successful bidder’s furnishing of performance guarantee pursuant to this RFP, procuring agency will promptly notify each unsuccessful Bidder and will discharge their respective bid security(s). The technical and financial proposals of both successful and unsuccessful bidders will be retained by the procuring agency.

(n) The bid sum as submitted and read out during financial bid opening shall be absolute and final and shall not be the subject of correction, adjustment or amendment in any way by any person or entity except that if the Bid is substantially responsive, the procuring agency shall handle only the undermentioned errors on the following basis:

(i) Bidders shall be notified of any correctable error detected in their

bid during the notification of award.

(ii) Any arithmetic errors in the submitted bid arising from a miscalculation of unit price, quantity, subtotal and total bid price shall be rectified on the following basis:

- If there is a discrepancy between words and figures, the lowest amount, either in words or figures, shall be considered.
- If there is discrepancy between the unit price and the total price which is obtained by multiplying the unit price and quantity, or between sub- total and the total price, the unit or sub-total price shall prevail, and the total price shall be corrected.
- In case of discrepancy between sub-total price obtained by adding various prices in the schedule and the sub-total price indicated for that particular schedule, the sub-total obtained by addition of various arithmetically corrected prices would be considered for evaluation.
- In case of any discrepancy in the applicable rates or calculation of applicable taxes discussed, agreed and added to the contract amount in separate lines, as needed, corrections in item and subtotal prices may be allowed as per applicable Govt. rates / rules.
- The procuring agency shall be entitled to award the contract to the most advantageous bidder after applying permissible arithmetic / tax corrections in the bid proposal sheets. If the bidder does not accept the correction of the errors as above, his bid will be rejected.

13. **Bidder's Eligibility:** The Firms, companies, distributers / suppliers registered with Income Tax and Sales Tax Department for Design and Development of Agricultural Unmanned Aircraft System (UAS) and Drones for GPSAR Applications.

14. **Bid Security**

(a) Bid security will be equal to **Rupees 200,000/-** and will be in the shape of pay order / demand draft in favor of Project Director Green-AI, Alpha-19, Old Airport Road, NASTP Rawalpindi. Bid security shall be attached with the technical proposal otherwise proposal will not be accepted.

(b) Bids without required Bid security will be rejected without any right of appeal.

(c) The bid security shall be forfeited in case of occurrence of any one of the following:

(i) If a bidder withdraws its bid during the period of bid validity specified in this RFP document; or

(ii) In the case of successful bidder, if it fails:

- To furnish performance guarantee in accordance with the RFP document; and
- To sign the contract.

(d) Bid security of unsuccessful bidders will be returned upon the award of contract to successful bidder, and after furnishing of the performance guarantee.

15. **Performance Guarantee**

(a) Performance Guarantee (PG) equal to **10%** of total contract amount will be submitted before signing of contract. PG will be kept against SLA/support and will only be released after completion of warranty/technical support period (1 year) as per the contract.

(b) The Performance Guarantee shall be as Bank Guarantee Form (attached with draft contract) or CDR from any Scheduled Bank in Pakistan in favor of Project Director Green-AI, Alpha-19, Old Airport Road, NASTP Rawalpindi.

(c) In case of cancellation of contract due to default of the supplier, the performance guarantee shall be forfeited in favor of procuring agency.

(d) The bidder should quote its rates clearly in Pak Rupees in the Financial Proposal in both figures and words as per format attached at **Annex 'C'**.

(e) The rates for each UAV platform offered shall be quoted on separate lines.

(f) The Bid shall remain valid for **ninety (90) calendar days** from technical bid opening date and further it may be requested to be extended by procuring agency.

(g) A bid valid for a shorter period shall be rejected by procuring agency as non-responsive.

(h) Price and all other terms and conditions shall be fixed and firm throughout Bid validity period.

(i) No currency exchange rate will be applicable and bids with a condition of currency exchange rate applicability will be rejected without any right of appeal.

(j) Bid(s) shall be inclusive of all applicable taxes, duties, charges, levies, etc.

16. **Payment Procedure**

(a) Milestone based payment disbursement procedure will be adopted on per-platform basis.

(b) Acceptance criteria against milestones will be finalized as per platform specifications and made part of the contract document. All payments will be subject to acceptance of milestones against the acceptance criteria which is made part of the final contract.

(c) Bidder is to present a Sales Tax invoice (where applicable) / numbered bill upon completion of each milestone for disbursement of the amount agreed upon for the completed milestone as per the final contract.

(d) All taxes applicable on the amount of bill will be deducted at source.

(e) Crossed cheques of applicable amount (in the favor of the respective bidder) will be issued from Project Director **(GreenAI)**.

(f) Milestones and deliverables are as follows and apply to each platform being offered individually.

(g) Bank charges incidental to the withdrawal of payment shall be borne by the Supplier.

Table 1. Schedule of Payment for services

MS. No	Conditions	Payment to be made
1.	**Framework Operationalization and Testing (Integration, Testing, Training & Documentation)** **Note**: The bidder shall demonstrate proven capability in integrating secure customized avionics communication modules with encrypted UAV telemetry networks, including the ability to interface with existing proprietary protocol frameworks used by the procuring agency systems. (Delivery within 60 working days of award of contract)	100%

Table 2. Schedule of Payment for COTS items

MS. No	Conditions	Payment to be made
1.	• Delivery of **GCS Development Kit as mentioned in BoM [Table-04]** • **Technical Acceptance evaluation** as per **Table 04** of SRS-01 (Delivery within 30 working days of award of contract)	100% on receipt of items
2.	• Delivery of **ANP Development & Integration Kit as mentioned in BoM [Table-04]** • **Technical Acceptance evaluation** as per **Table 04** of SRS-01 (Delivery within 30 working days of award of contract)	100% on receipt of items
3.	• Delivery of **Software Evaluation Station as mentioned in BoM [Table-04]** • **Technical Acceptance evaluation** as per **Table 04** of SRS-01 (Delivery within 30 working days of award of contract)	100% on receipt of items

Table 3. Schedule of Design & Manufacturing items

MS. No	Conditions	Payment to be made
1.	**Design of GCS enclosure with its accessories** (Delivery within 30 working days of award of contract)	50%

2.	**Manufacturing & Assembling of GCS enclosure with its accessories and Acceptance** (Delivery within 60 working days of award of contract)	50%

* **Note:** Partial payments against each milestone may be processed by the successful bidder depending upon the requirements and after approval of the procuring agency.

17. **Delivery/Completion Period**

(a) All components of the tender shall be delivered within three (03) months' time after effective date of signing of Letter(s) of Acceptance (LoAs).

(b) Delivery period may be extended in case of events beyond the reasonable control of Bidder. Bidder shall inform in writing to procuring agency of any such event and may request for extension in delivery period

18. **Litigation:** In case of any dispute only Court of Jurisdiction at Islamabad Pakistan will have the Jurisdiction to decide the matter**.**

19. **Force Majeure**

(a) "Force Majeure" means an exceptional event or circumstance, which is beyond a Party's control; which such Party could not reasonably have provided against before entering into the Contract; which, having arisen, such Party could not reasonably have avoided or overcome; and, which is not substantially attributable to the other Party.

(b) The developing agency / firm / vendor shall, within fifteen (15) days of its commencement, notify the Procuring Agency of any such event, act or circumstance which is relied upon by the Supplier for its inability to comply with its obligation. The Purchaser shall have the right to conduct investigations to satisfy itself about the genuineness of the "Force Majeure" event, act or circumstance. Non-availability of raw material for the manufacture of the Goods or export permit for the export of the Goods from the country of its origin shall not constitute "Force Majeure."

(c) If by reason of "Force Majeure" the Goods are not delivered by the due date, then the Delivery Period may be extended appropriately for the purpose, provided the said Goods shall be ready to be delivered within one (1) month of the stipulated delivery date. If the said Goods are not ready to be delivered after the lapse of one (1) month as aforementioned, then the Purchaser shall have the right to cancel the Contract by informing the Supplier of the cancellation in writing. This, however, will not apply to consignments of Goods already accepted and delivered according to the terms of the Contract. The Supplier shall not be entitled to any compensation whatsoever as a result of this cancellation.

20. **Arbitration:** All matters of dispute or difference, except regarding rejection of stores / Services by the inspector and or cancellation of the contract by the Purchaser arising out of this contract between the parties hereto, shall be settled by mutual agreement, failing which they shall refer for Arbitration to Project Director Green AI who will be the sole arbitrator of the disputed matter and two representatives, one to be nominated by each party, will assist PD Green AI for decision. The award/decision of PD Green AI (The Sole Arbitrator) will be final and binding on all parties such as Supplier, Purchaser and related party (if any).

21. **Risk Purchase:** In the event of failure on the part of the developing agency to comply with the contractual obligations, the contract is liable to be cancelled at his risk and expense of Successful bidder.

22. **Application of Official Secret Act 1923:** All matters connected with this in query and subsequent actions arising there after fall within the scope of the Pakistan Official Secret Act 1923 which forbids providing contractual information to un-authorized/ un-concerned person/ organization. It is therefore, requested to ensure complete secrecy regarding documents and stores concerned with the inquiry to limit the number of employees having accesses to this information.

23. **Withdrawal of Offer**: If the bidder withdraws its bid or backs out from providing items won by the bidder within validity period at any stage of contract finalization, procuring agency may place such bidder under embargo for a period of twelve months, which may extend up to eighteen months and forfeiture of Bid Security or Performance Guarantee, as applicable.

24. **Disqualifications:** Proposals will be liable to be rejected if any deviation is found from the instructions as laid down in the bid document i.e.

(i) Technical bid is submitted without the required bid security.

(ii) Proposals are found conditional or incomplete in any respect.

(iii) Multiple rates are quoted against one item.

(iv) Bids are received after specified date and time.

(v) Mandatory requirements of Evaluation Criteria are not fulfilled.

(vi) Mandatory Technical Requirements of UAS are not properly adhered to.

(vii) Bidder is not the principal manufacturer of proposed & baseline platforms.

(viii) Any inferior product/specifications than the specifications provided in SRS-01 document.

25. **Termination of Contract:** If at any time during the pendency of the Contract, the Purchaser decides to terminate the Contract for any reason whatsoever (other than for reason of failure to Deliver the Goods), it shall have the right to do so by giving the Supplier a notice to that effect. In that event, the Purchaser will accept delivery, at the itemized price and terms, of such of the Goods then in the actual possession of the Purchaser.

(a) In the case of remainder of the undelivered Goods, the Purchaser may select either:

(i) To have any part thereof completed and take the delivery thereof at the itemized prices, or

(ii) To cancel the residue and pay to the Supplier for the Goods or components thereof in the actual possession of Supplier at the prices to be determined by the Purchaser in which case Goods in the possession of Supplier shall be delivered by the Supplier.

(b) No payment shall, however, be made for any Goods not yet in the actual possession of Supplier on the date notice of termination is received

26. **Authority to Sign Documents:** Proposal must be accompanied by Letter of Authorization to sign the Tender on behalf of the Bidder. Bidder must prove that the person who signs this Tender is fully authorized to bind his establishment / company.

27. **Grievances Redressal Committee**

(a) After submission of bid and prior to award of the contract, any bidder feeling aggrieved by any act of procuring agency may lodge a written complaint concerning his grievances to GRC constituted under Rule 48 of PPRA within 07 days of announcement of the technical evaluation report and 05 days after issuance of final evaluation report.

(b) GRC will immediately initiate the investigative action and decide the complaint within ten days of its receipt. The decision of GRC shall be intimated to the complainant / aggrieved bidder. The decision of the GRC shall be binding upon all the parties.

28. **Bidding Clarifications**

(a) In case any clarification is required regarding RFP, bidder may contact on following address till one week prior to the deadline for submission of tenders.

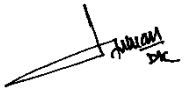
Technical Clarification: 0317-7078008 / 0308-0571303

Bidding Procedure: 0324-4411999 / 03244447655

(b) A prospective bidder requiring any clarification of the RFP documents which is essential to enable the prospective bidder to submit its Bid, may notify the procuring agency in writing through on email address of the Project Director GreenAI mentioned below.

(c) The procuring agency may reach out to the prospective bidders for additional information or clarification during the submission, evaluation, and discussion periods.

29. **Rights Reserved:** Procuring Agency reserves the right to accept or reject any proposal and to annul the procurement process and reject all proposals at any time prior to contract award as per rule 33 of PPR 2004 without there by incurring any liability to the affected Bidder.



Project Director (GreenAI)
NASTP, Alpha 19,
Old Airport Road, Rawalpindi
pd@greenai.org.pk

Date: - 18 March, 2026

Annexure 'A'

SRS-01

SYSTEM REQUIREMENT SPECIFICATION

FOR

DESIGN & DEVELOPMENT OF UAS-ASMS HARDWARE PHASE II

AS A COMPONENT OF PSDP APPROVED PROJECT TITLED "DEVELOPMENT OF ICT AND ARTIFICIAL INTELLIGENCE (AI) BASED PRECISION AGRICULTURE SYSTEMS UTILIZING DUAL-USE AEROSPACE TECHNOLOGIES - GREEN-AI"

1. Project Description

The requirements described in this RFP are tailored for hardware procurement under the UAS-ASMS Phase II project, aimed at enabling simultaneous monitoring and control of multiple Unmanned Aerial Systems (UAS) through a single Ground Control Station (GCS) within the GreenAI ecosystem. The proposed system will support agricultural drone operations including crop scouting, remote sensing, spraying, and seeding across various agricultural field sizes through different categories of UAV platforms.

Vendors may submit proposals for the procurement of the required hardware components, including Ground Control Stations, telemetry communication equipment, and associated system hardware compatible with the existing UAS-ASMS framework. The solution offered must meet the specifications and operational requirements described in this RFP. The selected vendor will be offered a contract for the procurement of the required hardware solution for the UAS-ASMS Phase II. Upon successful validation of the hardware against the defined requirements, the system may be adopted for operational deployment within the Project GreenAI ecosystem to support scalable multi-UAS agricultural operations.

2. Scope of Project

The project aims to upgrade and expand the existing UAS Airspace Management System (UAS-ASMS) framework to enable simultaneous monitoring and control of multiple Unmanned Aerial Systems (UAS) through a single Ground Control Station for agricultural operations. The system shall support coordinated operation of different UAV platforms within the GreenAI ecosystem for applications such as crop scouting, remote sensing, spraying, and seeding across various agricultural fields. The selected bidder shall ensure compatibility and integration with the existing UAS-ASMS framework, communication infrastructure, and command and control mechanisms. The project includes system integration, operational deployment, and provision of necessary technical support, and operational training for technical staff.

3. Core Hardware

List of components of GCS Development Kit, ANP Development & Integration Kit and Software Evaluation Station for UAS-ASMC Hardware Phase II applications is given below:-

Table 4. Technical Specification of Hardware

S No	Component	Technical Scrutiny Report (Technical Specifications Report)		
		Item	**Qty**	**Specifications**
1	**GCS Development Kit**	**Ruggedized Laptop**	**07**	**Processor**: Processor: Intel Core i7/i9 (12th Gen or newer), Minimum 8 physical cores (12+ threads), Base clock ≥ 2.8 GHz, Turbo ≥ 4.5 GHz **RAM**: 32 GB DDR4 or DDR5 (non-negotiable) (upgradable to 64 GB) **Storage**: 1 TB NVMe Gen 4 SSD (Primary) **OS**: Windows 11 Pro **Weight**: Lightweight **Display**: 15.6" or 16", Minimum Resolution: 1920x1080, Preferred: 2560x1600 (QHD), Brightness ≥ 1000 nits, Matte anti-glare **Graphics**: NVIDIA RTX A1000 / RTX 3050 / RTX 3060 "OR" NVIDIA T1200 (workstation class) with Minimum 4 GB VRAM (8 GB preferred) **Wi-Fi**: 802.11ac/ax, Bluetooth 5.0 **Ports**: 1 x USB ≥ 3.0, 1 x USB Type-C or USB 3.2, HDMI or DisplayPort, Ethernet **Battery**: Minimum 90 Wh battery, Hot-swappable battery preferred, ≥ 7 hrs runtime **Audio**: Stereo speakers, dual mic, 720p webcam **Security**: TPM 2.0, optional fingerprint/face recognition **Durability**: MIL-STD-810G, IP65, drop-resistant (1.2m) **Temperature**: -20°C to 60°C operation **Warranty**: 3 years **01 x Spare Battery Pack** **01 x External Mouse and Keyboard 01 x laptop charger**
		Telemetry Module	**08**	**Item:** Long-Range Integrated Digital Telemetry & HD Video Transmission System **Antenna Part Number:** High-gain detachable antenna(s) suitable for extended LOS operations **Frequency**: 2.4 GHz (control), 5.8 GHz (video) **Frequency Bands**: Dual-band operation supporting; 2.4 GHz ISM band for control & telemetry, 5.8 GHz ISM band for digital video transmission **Signal Bandwidth:** Selectable channel bandwidth: 10 MHz / 20 MHz **Range**: Minimum 15 km Line-of-Sight (LOS), Preferred: ≥ 20 km LOS under optimal conditions **Latency**: Control link latency ≤ 50 ms, Video transmission latency ≤ 100 ms **Video Output**: HDMI video output, USB / UART telemetry interface, Minimum 1080p @ 30 fps real-time digital video transmission **Telemetry**: Bi-directional MAVLink-compatible real-time telemetry **Power**: 6-12V DC input **Weight (Transceiver)**: ≤ 120 grams **Operating Environment**: Field deployable, vibration resistant, suitable for UAV integration
		RTK Base	**07**	**Item: RTK GNSS Base Station Module Receiver**: Multi-constellation, dual-band GNSS receiver supporting (GPS, GLONASS, Galileo, BeiDou) **Accuracy**: 2.5 cm (RTK), < 1 m (DGPS) **Update Rate**: 10 Hz **Interface**: RS232, USB, CAN **Power**: 5-12V DC **Operating Temp**: -40°C to +85°C **Weight**: 150 g **IP Rating**: IP67
		GSM/GPRS Module	**07**	**Network**: 4G/5G LTE (Cat. 1) **Bands**: Supports multiple LTE bands

				Data Rate: 10 Mbps (downlink), 5 Mbps (uplink) **Interface**: UART, USB, I2C **Power**: 3.4V to 4.4V **Temp**: -40°C to +85°C		
		Battery Pack (Telemetry)	**16**	**2S** 5000 mAH Li-Po Battery pack		
		Battery Pack Charger	**07**	Li-Po Battery Charger (1-6S, balance charger with feedback)		
		USB 3.0 Port Extender	**07**	6+ ports		
		GSM USB Converter	**07**	GSM to USB (programming chip/module)		
		Ethernet Port Extender	**07**	≥ 6 ports of ethernet		
		ANP	**08**	Air Network Procession unit SWAP • Dimensions: 80mm x 40mm x 20mm • Enclosure: Key protection featured case • Key Protection: Hardware protection of keys using limit switch • Interfaces: USB, Ethernet, Serial, RF • Display: HDMI Operating Conditions • Operating Temperature: 0-60oC • Power Consumption: -58 mW (idle) to 64 mW (during encryption) • Input Voltage: 4.8 – 5.2 V • Max Input Power: 15 W Core Components • Processor: Quad Core Cortex A-53, Allwinner H618 Quad-Core Cortex-A53, 1.5 GHz • Memory: 4 GB RAM, 16 GB Flash Encryption: FPGA Kryptor (Hardware based) • FPGA Specifications: Intel/Altera MAX10 8K LE, Internal Flash: 1376 KB, Internal RAM: 378 KB, Encryption Speed: Camellia symmetric encryption up to 108 Mbps RF Module: SX1262-based auxiliary chip for embedded management		
		Ruggedized Carrying Case	**07**	Ruggedized carrying case for Laptop, RTK, Telemetry module, GSM module **Material:** Carbon Fibre **Commercial Standards** **Customized Design**		
		Laptop Cooling Fan	**07**	Cooling fan units for ruggedized laptop		
		Customized box	**18**	For modules placement in GCS		
		Programmable Linear DC Power Supply	**01**	**Triple output programmable linear DC power supply** **Minimum output capability:** **Channel 1 & 2: 0–50 V, ≥80 A each** **Channel 3: 0–5 V, ≥20 A** **Low ripple and noise: ≤ 1 mVrms (typical)** **High resolution: ≥ 1 mV / 1 mA setting resolution** **Display: Digital (LCD/TFT) with simultaneous voltage/current monitoring** **Modes of operation: Independent, series, and parallel tracking modes** **Protection features: OVP, OCP, OTP** **Interface support: USB / LAN (preferred) for remote programming**		

2	**ANP Development & Integration Kit**	**Precision Soldering Station**	**01**	Digital precision soldering station for SMD / micro-electronics work Temperature range: 90°C to 450°C (or better) Fast heating: ≤ 5 seconds to ~300°C Temperature control: PID or equivalent, stability ±2°C or better Support for cartridge-type tips with integrated heater/sensor Digital display for set and actual temperature Minimum 3 preset temperature memories Features: sleep, standby, and auto shut-off ESD-safe design Power rating: ≥ 100 W Input: 220–240V AC, 50/60 Hz Supplied with handle, stand, and essential accessories		
		Soldering Helping Hand / PCB Holder Kit	**01**	**Multi-arm soldering helping hand system for PCB assembly and repair** **Heavy-duty metallic base with high stability (minimum ~2 kg)** **Minimum 3–4 flexible adjustable arms with alligator clips** **360° adjustable joints for precise positioning** **Integrated PCB holder / fixture support** **Magnetic or modular base system for flexible configuration** **Optional magnifier with LED illumination (preferred)** **Heat-resistant clips with protective coating** **Non-slip base with rubber feet** **Suitable for electronics repair, soldering, and rework applications**		
		Monochrome laser printer	**01**	**Monochrome laser printer with print, scan, and copy functions** **Print speed: ≥ 30 pages per minute (A4)** **Print resolution: ≥ 1200 × 1200 dpi (effective or better)** **First page out time: ≤ 8 seconds** **Automatic duplex printing (built-in, standard)**		
		HMI-Display 75 inches (Non touch)	**01**	**4K UHD**	**Well reputed brands**	**UAS-ASMS Console**
		Smart Multi-Function Display (HMI Display 24 Inches)	**02**	**Touch Screen to serve as mission display Computer**	**Well reputed brands**	
		Workstation console	**01**	**30x60 Inches Desktop to House 02x Mission Display computers (MDC)**	**Customizable to size of MDCs**	

				Duty cycle: ≥ 30,000 pages/month (designed for high-volume continuous printing) **Recommended monthly volume: ≥ 2,000–5,000 pages** **Connectivity: USB, Ethernet, and Wi-Fi (wireless printing support)** **Mobile printing support (AirPrint, Mopria or equivalent)** **Scanner: Flatbed + ADF (Automatic Document Feeder)** **ADF capacity: ≥ 35 sheets** **Scan resolution: ≥ 600 dpi** **Paper handling: ≥ 250-sheet input tray + output tray** **Processor & memory: adequate for high-volume job handling (≥ 256 MB RAM preferred)** **Designed for continuous operation with thermal management (no performance degradation under bulk printing)** **Compatible with high-yield toner cartridges for long-term cost efficiency** **Compact desktop or small office form factor** **Power: 220–240V AC, 50/60 Hz**		
		Multi-Purpose Wire Stripping & Cutting Tool	**02**	Hand tool suitable for cutting, stripping, and crimping electrical wires Compatible with solid and stranded conductors (approx. 10–20 AWG or equivalent range) Integrated wire stripper with multiple gauge slots Built-in cutting and crimping functionality Precision-ground stripping holes for clean insulation removal without conductor damage High-strength hardened steel construction Ergonomic, non-slip cushioned grips		
		Drone Development Kit	**03**	Modular quadcopter UAV development kit for research, testing, and prototyping Carbon fiber frame with wheelbase Advanced autopilot flight controller (open architecture, PX4/ArduPilot compatible or equivalent) Integrated GNSS module (GPS or better) and telemetry communication system Complete propulsion system including motors, ESCs, and propellers (pre-integrated or plug-and-play) Power distribution module with standard battery interface (e.g., XT60 or equivalent) Payload capacity: ≥ 3 kg (small platform) up to ≥ 5 kg (preferred) Support for companion computers (e.g., AI modules), cameras, and additional sensors Easy assembly design (minimal or no soldering required) Compatible with ground control software for mission planning and development Suitable for autonomous flight, AI/vision development, and academic/research applications		
		Ultra Wide Angle FPV Gimbal with Camera	**01**	Compact FPV gimbal camera module with single-axis (tilt) stabilization (2-axis preferred) Ultra-wide field of view: ≥ 155° (horizontal) Video resolution: Full HD 1080p @ ≥ 30 fps (support for higher frame rate preferred) Gimbal tilt control: ≥ -90° to +30° or wider range Image sensor: ≥ 2 MP CMOS (starlight/low-light capable), larger sensor size preferred Enhanced low-light performance with digital noise reduction (DNR) and HDR support Digital distortion correction and image stabilization support Control interface: PWM / S.Bus / UART / Ethernet or equivalent Video output: Digital (Ethernet/IP or equivalent low-latency protocol) End-to-end latency: ≤ 120 ms (or better) Power input: 9–16V DC wide input range, low power consumption (≤ 15W peak) Environmental protection: IP66 or better		

				Operating temperature: ≥ -20°C to +55°C Weight: ≤ 120 g (including gimbal assembly) Compact and aerodynamic design suitable for UAV integration Support for upside-down mounting, multiple orientation configurations, and quick installation Compatibility with onboard processing systems (AI/companion computers) and SDK/firmware integration (preferred)		
		Lipo Batteries (3S,4S, 6S, 12S)	**08**	Lithium Polymer (Li-Po) battery packs in configurations: 3S, 4S, 6S, and 12S Capacity (mAh) shall be sized to support ≥ 60 minutes UAV flight time under operational load Discharge capability: Continuous discharge rating: high-current (≥ 25C or as required) Burst discharge capability: support instantaneous current draw up to 700 A (or better) Nominal voltage per cell: 3.7 V (standard Li-Po chemistry) High energy density with low internal resistance Equipped with standard high-current connectors (e.g., XT60 / XT90 / AS150 or equivalent) Integrated balance leads for cell monitoring and safe charging Safety features: over-current, short-circuit, and thermal protection (or compatible with external BMS/monitoring system) Robust outer casing suitable for UAV and field operations Rechargeable with compatible smart/balance chargers Operating temperature range suitable for outdoor UAV applications		
		BLDC Motors + Propellers	**16**	High-efficiency brushless DC (BLDC) motors for multirotor UAV applications (heavy-lift capable) Motor class: suitable for medium to heavy payload UAVs (equivalent to U8/U10 class or better) Operating voltage: 6S to 12S Li-Po compatible Maximum thrust (per motor): ≥ 5 kg (preferred ≥ 6–8 kg) Continuous current rating: high-current capable with efficient thermal performance Peak current handling: suitable for high transient loads (≥ 60–80 A or better) Motor efficiency: high-efficiency design with low heat generation and optimized winding Construction: CNC-machined aluminum alloy housing with high-strength shaft Bearings: high-quality sealed bearings for long operational life Protection: dust-resistant and suitable for outdoor UAV operations Propellers: High-strength carbon fiber or reinforced composite propellers Size: large diameter (≥ 28–32 inches or suitable for motor class) Foldable type preferred for portability Aerodynamically optimized for high thrust and efficiency Mounting: standard UAV mounting compatibility (multi-rotor frames) Operating temperature: suitable for extended outdoor and continuous operation System compatibility: Compatible with high-current ESCs (≥ 80–120 A or better) Suitable for long-endurance and heavy-lift UAV applications		
		Flight Controller	**02**	High-performance autopilot flight controller for multirotor and fixed-wing UAVs Architecture: open-source compatible (PX4 / ArduPilot or equivalent)		

				Processor: high-speed 32-bit processor (≥ 400 MHz or better) with dedicated co-processors (preferred) Sensors: Triple redundant IMUs (accelerometer + gyroscope) Redundant barometer (dual or better) Integrated vibration isolation system for sensor accuracy Navigation support: Compatible with external GNSS modules (GPS / GNSS multi-constellation preferred) Support for compass/magnetometer integration Interfaces: Multiple UART, I2C, SPI, CAN (UAVCAN preferred), PWM outputs Dedicated ports for telemetry, RC input, GPS, and peripherals I/O capability: ≥ 8 PWM outputs (expandable preferred) Support for ESC protocols (PWM, DShot or equivalent) Data & logging: Onboard high-speed logging (SD card or equivalent) Real-time telemetry and health monitoring Power: Dual power input support with redundant power management (power module compatible) Safety features: Failsafe modes, geofencing, return-to-home, and redundancy support Environmental: Designed for high-vibration UAV environments and outdoor operations Expandability: Support for companion computers (AI modules), cameras, LiDAR, and additional sensors Firmware upgradable with SDK/API support (preferred)		
		Spatial Visualization	**01**	Item: Head-Mounted Spatial Visualization and Interaction System (for immersive command, simulation and remote operation applications) Form Factor: Lightweight wearable head-mounted device enabling stereoscopic spatial visualization and natural user interaction. Display System: Dual high-resolution micro-display architecture Minimum per-eye resolution equivalent to ≥ 2K Wide field of view suitable for immersive spatial visualization Refresh rate ≥ 90 Hz Tracking & Interaction: Inside-out positional tracking (no external base stations) Support for: • Head tracking • Hand gesture interaction • Controller-based interaction (optional) • Spatial mapping of surrounding environment Sensors: Integrated inertial sensors and depth sensing capability Eye and/or hand tracking capability preferred Processing Mode: Capable of: • Standalone operation • Wireless PC connectivity for high-performance rendering • Low-latency remote streaming from workstation Connectivity: Wireless connectivity supporting: • Wi-Fi 6 / 6E or better (low latency streaming) • Bluetooth ≥ 5.2 Support for PC tethering via USB-C / equivalent for development mode		

				Latency: End-to-end interaction latency suitable for real-time control applications (≤ ~50 ms preferred) Software Compatibility: Compatible with: • Unity • OpenXR / equivalent standard • Simulation and visualization frameworks • Custom application deployment Operational Capability: Capable of running deployed applications without physical cable connection during operational use. Audio: Integrated spatial audio output and microphone array Battery: Self-contained power module enabling untethered operation Minimum continuous runtime ≥ 1.5 hours Ergonomics: Adjustable head mounting Suitable for extended use sessions Weight ≤ ~700 g preferred Application Scope: Suitable for: • Immersive visualization • Human-machine interface research • Remote system operation • Training and simulation • UAV command visualization Environmental: Portable field-deployable device Warranty: Minimum 1 year Clause: or equivalent meeting or exceeding the above specifications.		
		GNSS RTK Module	**02**	High-precision GNSS receiver module with RTK (Real-Time Kinematic) capability Positioning accuracy: RTK mode: centimeter-level accuracy (≤ 2 cm horizontal, ≤ 3 cm vertical) Standard GNSS mode: ≤ 1.5 m CEP or better Multi-constellation support: GPS, GLONASS, Galileo, BeiDou (multi-band preferred) Update rate: ≥ 10 Hz (higher rates preferred) Integrated sensors: Dual or triple redundant compasses (magnetometers) Optional integrated IMU for heading and stability (preferred) Communication interfaces: CAN (UAVCAN preferred), UART, I2C or equivalent RTK functionality: Support for RTK base and rover configuration Compatible with NTRIP correction services and ground-based base stations Antenna: High-precision GNSS antenna (multi-band, survey-grade preferred) Integrated or external antenna support Environmental protection: IP66 or better Operating temperature: ≥ -20°C to +60°C Power input: 5V DC (typical) with wide tolerance Low power consumption suitable for UAV integration Mounting: Standard UAV mounting with EMI shielding and anti-interference design Compatibility: Fully compatible with open-source flight controllers (PX4 / ArduPilot or equivalent)		

		Integrated UAV Ground Control Station with Digital Video & Data Link	**02**	All-in-one handheld ground control station integrating RC control, telemetry, and HD video transmission Control system: ≥ 16 control channels (expandable preferred) Frequency band: 2.4 GHz digital FHSS or equivalent anti-interference system Transmission capability: Range: ≥ 20 km (Line-of-Sight) Integrated video, data, and control link (3-in-1 system) Low latency HD digital video transmission (1080p or better) Display: Integrated ≥ 7-inch high-brightness display (sunlight readable) Support for real-time telemetry, video feed, and mission data Operating system: Embedded smart OS (Android or equivalent) supporting ground control applications Interfaces: HDMI, Ethernet (RJ45), USB/Type-C, SBUS, UART/serial interfaces Support for external payloads (gimbals, cameras, sensors) Compatibility: Compatible with open-source flight controllers (PX4 / ArduPilot or equivalent) Support for QGroundControl / RTSP streaming / SDK integration Battery & endurance: Integrated high-capacity battery (≥ 20,000 mAh) Operating time: ≥ 8–12 hours continuous use Fast charging support (USB Type-C or equivalent) Build & environmental: Rugged design with IP67 or better protection (water/dust resistant) Operating temperature: ≥ -10°C to +55°C Control interface: Ergonomic design with dual sticks, programmable switches, knobs, and auxiliary controls Support for custom mapping and configuration Receiver system: Included/compatible multi-channel receiver with wide voltage input (approx. 7–72V DC) Robust anti-interference and long-range communication capability System capability: Designed for UAV, robotics, surveillance, mapping, and industrial applications Supports multiple payloads and future system expansion		
		Optical Flow Module	**02**	Integrated optical flow sensor module for precise position hold and navigation in GNSS-denied environments Sensing capability: High-resolution optical flow camera for motion estimation Integrated distance/range sensor (LiDAR/laser/ToF preferred) Operating altitude range: ≥ 0.1 m to ≥ 10 m (or better) Accuracy: high-precision velocity and position estimation for stable hover and indoor flight Performance: Update rate: ≥ 100 Hz (or better) Low-light capability for indoor and low-illumination environments Automatic surface texture adaptation Interfaces: I2C, UART, CAN (preferred) Compatible with open-source flight controllers (PX4 / ArduPilot or equivalent) Data output: Real-time velocity vectors, distance measurements,		

				and quality metrics Field of view: wide-angle lens (≥ 40° or better) Environmental: Operating temperature: ≥ -10°C to +50°C Resistant to vibration and typical UAV operating conditions Power input: 5V DC (typical) with low power consumption Physical: Lightweight and compact: ≤ 50 g Easy mounting with downward-facing configuration Additional features: Built-in IMU or sensor fusion capability (preferred) Support for automatic calibration and firmware updates		
		Titanium Gear Servos	**04**	High-performance digital servo motors suitable for UAV, robotics, and precision control applications Gear system: Full metal gear train (titanium gears preferred) for high strength and wear resistance Torque: ≥ 20 kg·cm (at 6–8.4V) for standard applications Higher torque variants (≥ 40–60 kg·cm preferred) for heavy-duty use Speed: ≤ 0.15 sec/60° (or faster) Operating voltage: Wide voltage range (≥ 6.0V to 8.4V, HV servo support preferred) Control: Digital control with high resolution and fast response Compatible with PWM control signals (standard RC interface) Positioning: High precision positioning with minimal deadband Bearings: Dual ball-bearing system for smooth operation and durability Construction: Aluminum or high-strength metal casing for heat dissipation Shock-resistant and suitable for high-vibration environments Protection: Overload and stall protection (preferred) Water/dust resistance: ≥ IP54 (or better) Operating temperature: ≥ -10°C to +60°C Mounting: Standard mounting compatible with UAV/robotic platforms		
		Lightweight UAV LiDAR Distance Measurement Sensor	**02**	High-precision laser-based LiDAR rangefinder for UAV altitude sensing, terrain following, and obstacle awareness Measurement range: ≥ 0.2 m to ≥ 100 m (or better) Extended range variants (≥ 200 m preferred) Accuracy: ±2.5 cm or better (typical) High reliability across varying surface types Update rate: ≥ 50–100 Hz (configurable) Beam characteristics: Narrow beam divergence for precise distance measurement Good performance on low-reflectivity surfaces Interfaces: UART and I2C (CAN preferred) Compatible with open-source flight controllers (PX4 / ArduPilot or equivalent) Output data: Real-time distance measurements with signal strength/quality indicators Power input: 5V DC (typical), low power consumption Environmental: Operating temperature: ≥ -20°C to +60°C		

				Ambient light immunity (sunlight resistant operation) Protection: IP65 or better (dust and splash resistant) Physical: Lightweight and compact: ≤ 50 g Suitable for small to medium UAV integration Mounting: Standard mounting with vibration tolerance and EMI shielding Additional features: Support for multiple return / filtering (preferred) Firmware upgradable with configuration tools/SDK support (preferred)		
		Infrared Beacon Tracking & Precision Landing Sensor	**02**	Infrared (IR) sensor module for precision landing and beacon tracking in UAV applications Functionality: Detection and tracking of modulated IR beacon signals for accurate landing guidance Support for precision landing in GNSS-denied or low-accuracy environments Detection range: ≥ 10 m (preferred ≥ 15–20 m) Field of view: wide-angle (≥ 60° horizontal or better) Accuracy: High-precision angular offset estimation for landing correction Stable tracking with low drift and fast response Update rate: ≥ 50 Hz (or better) Latency: low-latency real-time tracking suitable for flight control loops Interfaces: I2C / UART / CAN (preferred) Fully compatible with open-source flight controllers (PX4 / ArduPilot or equivalent) Data output: Real-time target position (X/Y offset), signal strength, and tracking status Power input: 5V DC (typical), low power consumption Environmental: Operating temperature: ≥ -10°C to +50°C Resistant to ambient light interference (sunlight filtering capability) Physical: Lightweight and compact: ≤ 20 g Easy integration with downward-facing mounting Additional features: Support for multi-target detection (preferred) Firmware upgradable with configuration/calibration tools		
		High-Current UAV Electronic Speed Controllers (ESCs)	**16**	High-performance Electronic Speed Controllers (ESCs) suitable for medium to heavy-lift multirotor UAV applications Operating voltage: Compatible with 6S to 14S Li-Po battery systems Continuous current rating: ≥ 80 A continuous (preferred ≥ 120–160 A for heavy-duty applications) Burst current capability: Support for high transient loads with safe peak handling (≥ 150–200 A or better) Control protocols: Compatible with PWM, OneShot, DShot (preferred), or equivalent high-speed digital protocols Response characteristics: Ultra-fast throttle response with low latency Optimized for precision flight control and stable hover Efficiency: High-efficiency design with active freewheeling and low switching losses Thermal performance: Designed for continuous high-current operation Advanced thermal management and heat dissipation system Protection features:		

				Over-current protection Thermal protection Low-voltage cutoff Short-circuit protection Construction: High-quality PCB with industrial-grade MOSFETs EMI-resistant design for UAV applications Data & telemetry: Real-time ESC telemetry feedback (RPM, voltage, current, temperature) preferred Mounting & integration: Compact form factor suitable for UAV arm mounting Compatible with heavy-lift BLDC motors (≥ 5–8 kg thrust class) Environmental: Operating temperature: ≥ -20°C to +60°C Suitable for outdoor and high-vibration UAV environments		
3	**Software Evaluation Station**	**Portable Diagnostic Tester**	**01**	**Processor**: Processor: Intel Core i5/i7/i9 (12th Gen or newer) **RAM**: >16 GB DDR4 or DDR5 (upgradable to 32 or 64 GB) **Storage**: 1 TB NVMe Gen 4 SSD (Primary) **OS**: Windows 11 Pro **Weight**: Lightweight **Display**: 15.6" or 16", Minimum Resolution: 1920x1080, Preferred: 2560x1600 (QHD), Brightness ≥ 1000 nits, Matte anti-glare **Graphics**: NVIDIA RTX A1000 / RTX 3050 / RTX 3060 "OR" NVIDIA T1200 (workstation class) with Minimum 4 GB VRAM (8 GB preferred) **Wi-Fi**: 802.11ac/ax, Bluetooth 5.0 **Ports**: 1 x USB ≥ 3.0, 1 x USB Type-C or USB 3.2, HDMI or DisplayPort, Ethernet **Battery**: ≥ 5 hrs runtime **Audio**: Stereo speakers, dual mic **Warranty**: > 1 years **01 x External Mouse and Keyboard** **01 x laptop charger**		
		27 inch 4K UHD Monitor	**04**	**Screen size: ≥ 27-inch** **Resolution: Ultra HD 3840 × 2160 (4K)** **Panel type: IPS or equivalent with wide viewing angles (≥178°)** **Refresh rate: ≥ 60 Hz** **Brightness: ≥ 300 cd/m²** **Color support: ≥ 1.07 billion colors / high color gamut support** **Response time: ≤ 5 ms (typical)** **Anti-glare display with flicker-free / eye-care features** **Connectivity: HDMI and DisplayPort (minimum 1 each)** **Ergonomic stand: tilt (height/pivot preferred)** **VESA mount compatible** **Power: 220–240V AC, 50/60 Hz**		
		Color Printer	**01**	**Color laser printer** with **print, scan, and copy** functions Print speed: **≥ 25 pages per minute (A4) for both color and mono** Print resolution: **≥ 1200 × 1200 dpi (effective or better)** First page out time: **≤ 10 seconds (mono), ≤ 12 seconds (color)** **Automatic duplex printing (built-in, standard)** Duplex **scanning via DADF (Dual/Single-pass Automatic Document Feeder)** ADF capacity: ≥ 50 sheets Duty cycle: ≥ 50,000 pages/month Recommended monthly volume: ≥ 3,000–7,000 pages Connectivity: USB, Ethernet, and Wi-Fi Mobile printing support (AirPrint, Mopria or equivalent)		

				Scanner resolution: ≥ 600 dpi Paper handling: ≥ 250-sheet input tray (expandable preferred) Memory: ≥ 512 MB RAM Processor: ≥ 1 GHz Display: minimum **4-line LCD or equivalent user interface** Designed for continuous high-volume operation with efficient thermal management Toner support: • Standard and high-yield toner cartridges • Minimum toner yield: ≥ 3,000 pages (color each) and ≥ 5,000 pages (black) Form factor: office / departmental desktop Power: 220–**240V AC, 50/60 Hz**		
		100VA UPS	**03**	Type: True Online Double Conversion UPS with zero transfer time Capacity: ≥ 5 kVA / ≥ 4.5 kW (with ≥ 25% headroom for continuous load) Output: Pure sine wave, single-phase 220–240V AC, 50 Hz Power factor: ≥ 0.9 (preferably unity PF) Efficiency: ≥ 90% (online mode) Backup capability: System shall support minimum two high-performance workstations Backup duration: maximum achievable extended runtime (minimum ≥ 60 minutes under operational load) Provision for external battery bank to extend backup duration (mandatory) Battery system: Compatible with external battery modules (EBM) / battery bank Battery type: VRLA / Lithium-ion (preferred) High-capacity configuration with scalable runtime (hour-level backup capability) Integrated battery charging, monitoring, and protection system Protection features: Overload, short-circuit, surge, thermal, and battery deep discharge protection Bypass: Automatic and manual maintenance bypass Interface & monitoring: LCD display with load, battery, and system status Communication: USB / RS-232 / SNMP (network monitoring preferred) Design requirements: Suitable for continuous operation under high load without performance degradation Efficient thermal management for long-duration backup usage Low noise operation suitable for office/lab environment Form factor: Tower or rack-mount convertible Expandability: Support for additional external battery packs for increased runtime Installation: Complete with required cabling and safety-compliant connectors		
		PC Workstation-Software Evaluation	**02**	Form Factor: Professional Desktop Engineering Workstation Processor: High-performance multi-core processor Minimum 16 physical cores / 24 threads Base clock ≥ 3.0 GHz Turbo ≥ 5.0 GHz Latest generation architecture Memory (RAM): Minimum 64 GB DDR5 Expandable to ≥ 128 GB Storage: Primary: 1 TB NVMe Gen4 SSD (OS & tools) Secondary: 2 TB NVMe SSD (projects & datasets)		

				Additional SSD expansion slots required Graphics: Professional or mid-range dedicated GPU Minimum 8 GB VRAM Support for multi-monitor output USB / I/O (VERY IMPORTANT): Minimum: • 8 x USB ports total • At least 4 x USB 3.2 high-speed • Front panel USB access required • USB-C port required Display Outputs: Minimum support for 3 simultaneous displays HDMI + DisplayPort combination required Networking: 2.5 Gb Ethernet preferred Wi-Fi 6 / Wi-Fi 6E required Bluetooth 5.2+ Expansion: Multiple PCIe expansion slots for FPGA / capture / interface cards Cooling: Workstation-grade thermal design for sustained compute load Power Supply: ≥ 750 W high-efficiency PSU Peripherals: Professional keyboard (wired) Precision engineering mouse (wired) OS: Windows 11 Pro Warranty: 3 years workstation class		
		Data Aggregation Workstation	**02**	Form Factor: High-performance Compute Workstation (Tower) Processor: High-end multi-core processor Minimum 16 cores (preferred 24+) Base clock ≥ 3.0 GHz Turbo ≥ 5.0 GHz Memory (RAM): Minimum 128 GB DDR5 Expandable to ≥ 256 GB Graphics (CRITICAL): High-performance dedicated GPU suitable for: • AI training • Computer vision • 3D rendering • XR / VR Minimum: ≥ 16 GB VRAM Tensor / AI acceleration capability required Storage: Primary: 1 TB NVMe Gen4 SSD (OS) Secondary: 2 TB NVMe SSD (projects) Additional SSD slots required Display Outputs: Support for ≥ 4 displays HDMI + multiple DisplayPort USB / I/O: Minimum: • 8 x USB total • USB-C required • High-speed external storage support Networking: 2.5 Gb Ethernet preferred Wi-Fi 6 / 6E required Bluetooth 5.2+ Expansion: Multiple PCIe slots for additional GPU / accelerator cards Cooling: Workstation-grade high-thermal design for sustained		

				GPU load Power Supply: ≥ 1000 W high-efficiency PSU OS: Windows 11 Pro Peripherals: Professional keyboard and mouse Warranty: 3 years workstation class		

4. **List of Goods or Bill of Quantities**

Table 7 Bill of Quantities for GCS and Spares

S. No	Description	Quantities
1	GCS Development Kit	01
2	ANP Development & Integration Kit	01
3	Software Evaluation Station	01
4	GCS Integration with ANP and C2 Centre	01
5	Trials and Testing	01
6	GCS Assembling and Testing	01
7	ANP Training	01
8	ANP Integration	01
9	ANP and GCS Publications	01

Note: The Procuring Agency reserves the right to drop the order of any given accessory without defining any reason. Additionally, the procuring agency may vary the quantities specified for the UAS equipment within a range of 15% in accordance with PPRA Rules 2004.

Annexure 'A (1)'

PREPARATION OF PROPOSAL

1. Format of the Technical Offer is as follows:

   (a) All Forms and applicable Annexures completed & signed with no information missing.

   (b) Company Profile - Provide a thorough description of the Bidder's business, expertise, developed products/services, and mission and how this proposal is compatible with the Bidder's overall business objectives.

   (c) Design Plans

      (i) A full description of the proposed hardware against requirements outlined in SRS-01 along with appropriate justification for selection of specific platform configurations.

      (ii) Include specifications and data for meeting all the technical requirements in SRS-01, along with any other relevant information.

2. A description of the Bidder's design process as well as a basic description of intended pathways to deployment and operator training.

3. **Supporting Material**

   (a) Supporting material may include proposed system design architecture and/or product videos as per requirements of the Evaluation Criteria.

   (b) A list of all media/soft items submitted on the USB drive shall be attached in print form with the Technical Proposal.

4. **Timeline**

   (a) Estimated time required to complete each stage of the project.

   (b) Stages may include design, prototyping, manufacturing, delivery of goods and any other milestones.

   (c) Estimated total time to complete the project from the design to the presentation of a viable product for purchase.

5. **Human & Technical Resources**

   (a) A description of the relevant experience of key team members in Form A-2.

   (b) A description of the relevant technical resources in Form 3 of pre-qualification RFP.

   (c) The purpose of this section is to show that the Bidder has enough expertise to complete the project.

6. **Additional information:** Bidders may include any additional information or documentation they deem necessary.

7. The Technical Proposal Envelope shall contain the following:

(a) **From A-12** **Letter of Proposal** dully filled and signed by authorized signatory

(b) **Form A-1** Bidder's General Data Information Form

(c) **Form A-2** Professional Profiles for Key Resources

(d) **Form A-3** Technical Resource Record

(e) **Annexure D** to **Annexure G** dully filled & signed by authorized signatory.

(f) Bid Security in the form described in Bidding Process Instructions.

(g) Letter of Authorization to sign the contract on behalf of the Bidder.

(h) All Digital media on a USB drive with list of contents attached in hard copy.

8. The Bidder will submit its Financial Proposal in the form as provided in **Annexure – C**. The Financial Proposal Envelope shall consist of one (1) original copy and two (2) hard copies. The original and two (2) hard copies of the Financial Proposal are required to have the signature of a duly authorized person of the Bidder with the Bidder's seal/ stamp.

9. Any Bid received by the procuring agency after the Deadline for Submission of Bids shall be rejected and returned unopened to the Bidder. Delays in the mail/courier, delays of person in transit, or delivery of a Bid to the wrong office shall not be accepted as an excuse for failure to deliver a Bid at the proper place and time. It shall be the Bidder's responsibility to determine the way timely delivery of its Bid will be accomplished either in person, by messenger or by mail/ courier.

Form – "A-12"

(LETTER OF PROPOSAL)

[On Letterhead paper of the Bidder including full postal address, telephone no., fax no., e-mail address etc.]

Dated _____

Project Director, GreenAI
NASTP Alpha 19.
Old Airport Road, Rawalpindi
Email: pd@greenai.org.pk

Dear Sir,

1. Reference is made to the tender Enquiry No. _____.
2. Attached to this letter are documents listed below defining:
   (a) The principal place of business.
   (b) Duly filled-in all Proposal Forms along with required supporting documents and all other documents required to be submitted along with proposal.

3. We agree to abide by this Bid for a period of 90 days after the date fixed for technical proposal opening, or as extended, as per instructions given in RFP and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

4. We have submitted the Bid Security for an amount provided for in the RFP which is part of our Bid, issued in accordance with the provisions of the RFP, along with our technical proposal.

5. If our Bid is accepted, we will submit the Performance Guarantee for the required sum on the form as provided for in the RFP issued in accordance with the provisions of the RFP.

6. The procuring agency reserves the right to annul the procurement process. Further, procuring agency may reject all bids or proposal at any time prior to award of contract without incurring any liability to the affected bidders or any obligation to inform the affected bidders of the justification for procuring agency' action.

7. The procuring agency and its authorized representatives may contact the following persons for further information, if needed: -

Contact 1	Tel:
Contact 2	Tel:

8. This Proposal is made with full understanding that:

(a) Bids will be subject to verification of all information submitted for Request for Proposal at the time of bidding.

(b) The procuring agency reserves the right to amend the scope and value of any Contract under this project.

9. The undersigned declare that the statements made, and the information provided in the duly completed Proposal are complete, true, and correct in every detail.

_____

Stamp & Signatures

_____

(In capacity of)

Duly authorized to sign bid for and on behalf of

_____

WITNESS:

_____

Signature

Address _____

Form 'A-1'

BIDDER INFORMATION

Company Name	
Company Owner	
Company Registration	
Company Registration Date	
Company Address	
Workshop Address (if applicable)	
Phone Number	
Email Address	
Company Website (URL)	

Focal Person Details:

Full Name	
Position/Title	
City	
Phone Number	
Email Address	
Other Contact Info	

_____

(Name)

(Designation)

Form 'A-2'

PROFESSIONAL PROFILES FOR KEY RESOURCES

a) Resource Person Information

Name of Firm	
Name of Resource Person	
Proposed Position	
Highest Qualification	
Years of Experience	
Area(s) of Expertise	
PEC no: (applicable to engineers)	

2. Education:

   [Summarize college/university and other specialized education of staff member, giving names of institutions, dates attended, and degrees obtained.]

Name of Institution	Degree Title	Year of passing

3. Key Skills:

   [Give an outline of staff member's technical, soft, and hard skills that are pertinent to tasks assigned on this project. Use up to one page].

4. Professional Experience:

   [Summarize professional experience in reverse chronological order]

Organization	Year	Position	Project / Assignment	Description of tasks performed by resource person

5. Certifications / Workshops and Short courses

   [Enlist the certifications obtained, workshops and short courses attended that are pertinent to tasks assigned on this project]

6. Details of Tasks Assigned on this Project
7. Certificate

I, the undersigned, certify that to the best of my knowledge and belief, these biodatas correctly describe myself, my qualifications, and my experience.

Signature of Staff Member

Authorized official of firm

***Note:** Provide the details of all currently hired work force involve in this project including engineers, technicians as well.

Form 'A-3'

TECHNICAL RESOURCES RECORD

Name of Bidder: _____

S. No.	Equipment / Resource	Role / Use	Owned / Outsourced

(Name)

(Designation)

Annexure 'B'

EVALUATION CRITERIA

The evaluation committee appointed by the Project Director GreenAI project shall carry out its evaluation, applying the evaluation criteria and point system specified hereunder:

1. **Mandatory Requirements**

All mandatory requirements / documents have already been received and accepted by the procuring agency during pre-qualification phase. However, the bidder is to fill all the forms and meet other proposal preparation requirements as given in **Annexure 'A'.** Procuring Agency reserves the right to disqualify a bidder in case if desired documents / forms or data is found incomplete / missing.

2. **Detailed Requirements**

(a) Only the pre-qualified firms will be considered for detailed evaluation of technical bids. The detailed evaluation shall be carried out based on the criteria for the different categories and minimum passing marks prescribed hereunder:

S No	Category	Maximum Marks	Passing Marks
1.	Technical Experience	25	**70%**
2.	Compliance with Technical Specs	25	
3.	Product Capability	20	
4.	System Integration & Compatibility	20	
5.	Solution Presentation	10	
Total		**100**	

***Minimum passing criteria in each category is 70%.**

(b) Technical bid of firms scoring less than seventy percent (70%) overall marks or failing to obtain minimum passing marks against any of the above-mentioned category shall be rejected and their financial bids will be returned un-opened. Each responsive technical bid shall be attributed a technical score **(S*t*)**.

(c) The evaluation committee shall determine whether the financial bids are complete and without computational errors. The lowest financial bid (F_m) shall be given a financial score **(S*f*)** of 100 points. The financial scores of the bids shall be computed as follows:

$$\boldsymbol{Sf = 100 * \frac{F_m}{F}}$$ (F = amount of specific financial bid)

(d) Bids, in the quality cum cost-based selection (QCBS) shall finally be ranked according to their combined technical (S_t) and financial (S_f) scores using the weights (T= **60%** is the weight given to the technical bid, **P=40%** is the weight given to the financial bid, T+P=100):

$$\boldsymbol{S = St * T\% + Sf * P\%}$$

(e) Work will be awarded to the firm offering most advantageous bid evaluated as the highest ranked bid based on cost and quality.

Annexure "C"

FINANCIAL PROPOSAL FORM

1. TENDER INQUIRY No**: NASTP-GREENAI-HW-ACAST/05/2026**
2. Time and Date of opening: **08 April, 2026 at 1130hrs**

i. PRODUCTION READY HARWARE

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
S No	**Proposed Platform**	**Item / Component**	**Description / Specifications**	**Cost in Fig**	**Sales Tax in Fig**	**Total Price in Fig**	**Total Price in Words**
1	GCS Development Kit	Ruggedized Laptop					
		Telemetry Module					
		RTK Base					
		GSM/GPRS Module					
		Battery Pack (Telemetry)					
		Battery Pack Charger					
		USB 3.0 Port Extender					
		GSM USB Converter					
		Ethernet Port Extender					
		Air Network Processor (ANP)					
		Ruggedized Carrying Case					
		Laptop Cooling Fan					
		Customized box					
2	ANP Development & Integration Kit	Programmable Linear DC Power Supply					
		Precision Soldering Station					
		Soldering Helping Hand / PCB Holder Kit					
		Monochrome laser printer					
		Multi-Purpose Wire Stripping & Cutting Tool					
		Drone Development Kit					
		Ultra Wide Angle FPV Gimbal with Camera					
		Lipo Batteries (3S,4S, 6S, 12S)					
		BLDC Motors + Propellers					
		Flight Controller					
		Spatial Visualization					
		GNSS RTK Module					
		Integrated UAV Ground Control Station with Digital Video & Data Link					

		Optical Flow Module					
		Titanium Gear Servos					
		Lightweight UAV LiDAR Distance Measurement Sensor					
		Infrared Beacon Tracking & Precision Landing Sensor					
		High-Current UAV Electronic Speed Controllers (ESCs)					
3	Software Evaluation Station	Portable Diagnostic Tester					
		27 inch 4K UHD Monitor					
		Color Printer					
		100VA UPS					
		PC Workstation- Software Evaluation					
		Data Aggregation Workstation					

ii. TRAININGS / TRIALS / SERVICES FOR PRODUCTION READY HARDWARE

S No	Proposed Services	Services Category	Description	Frequency / Duration / No of Trainees etc.	Charges / Cost in Fig	Applicable Tax in Fig	Total Cost in Fig	Total Cost in words
1	GCS Integration with ANP and C2 Centre							
2	Trials and Testing							
3	GCS Assembling and Testing							
4	ANP Training							
5	ANP Integration							
6	ANP and GCS Publications							

***Note:** All sub-modules and services are to be quoted separately. Taxes on Services like Flight trials, trainings etc. are to be quoted as per GoP rules. Financial quotes for Modules to separately include at least following sub-categories: Baseline UAV, Production Ready UAV, Sensors (separate for Baseline and Production Ready), Datalink, GCS, and Accessories (carrying case, spares, etc.). Quote for trainings, trials, etc. to be quoted separately.

Grand Total _____Rs.

In Words _____

_____

(Name)

_____

(Designation)

Annexure "D"

UNDERTAKING

(Fill in and Return)

To

Project Director (Green AI)

Project Management Unit

NASTP A-19, Rawalpindi

Dear Sir,

I/We hereby submit our bid to supply "DESIGN & DEVELOPMENT OF UAS-ASMS Hardware Phase II Project" detailed in the SRS as you may specify in the contract at the prices given in Annex "C" and further agree that this bid will remain valid up to 90 days from the date of bid opening and will not be withdrawn or altered in terms of rates quoted and the condition stated therein on or before this date.

I/We understood the instructions to Tenders and condition of contract as laid down in tender document and thoroughly examine specification / drawing and / or patterns quoted in the Schedule to Tender and am/are fully aware to the nature of the goods required and my/our offer is to supply goods strictly in accordance with the requirements.

Witness's Signature:

Name:

N.I.C No.

Address:

Date:

Signature of Bidder:

Name:

N.I.C No.

Capacity in which Signing:

Address:

Date:

Tel: Telex/Fax

Annexure "E"

FORMAT OF AFFIDAVIT / UNDERTAKING

Bidder must submit following undertaking (on stamp paper of Rs.100), failing which the bid may be rejected at the discretion of procuring agency:

(a) I, Mr. ……. S/o…….. holding CNIC# ……. from M/s ……. Having Its business office at … ....., do hereby solemnly affirm and declare as under;

(b) That M/s ..... is not engaged, under investigation or offences or no proceedings are pending before FBR, Customs, NAB, any Judicial form, FIA or any other Govt. authority with respect to fraud, terror financing, money laundering etc.

(c) We also confirm that our firm has not been blacklisted by any National/International organization or forum and is entitled to carry out its business activities to the standard business ethics.

(d) That the Partner(s) / Officers of M/s…….. have not been subject to financial crime. Nor they every compounded with their creditors in any capacity.

(e) The above statement is true to the best of my knowledge and belief and nothing has been concealed or is false.

Note: In case any bidder is found in the list of "Blacklisted Firms-Pakistan" or related links at https://www.ppra.org.pk/ then its bid shall be rejected

Name:_____

Signature: _____

Stamp:_____

Annexure "F"

NON-DISCLOSURE AGREEMENT (NDA) OF CONFIDENTIAL INFORMATION

Except as required to further the relationship between the procuring agency and M/s_____or as expressly authorized in writing on behalf of procuring agency, M/s_____, its shareholders/partners, directors, advisors, officers, and employees shall not disclose, provide or share directly or indirectly by any mean (verbal, writing, social media), any Confidential Information (partial or complete) during the period of his/her relationship with the procuring agency or any time after the termination of such relationship.

Signed	Signed
Bidder	Bidder
Dated:	Dated:

Annexure "G"

CERTIFICATE FOR CORRECTNESS OF DATA / DOCUMENTS / INFORMATION

(Date .....)

It is certified that the data/ documents/ information submitted in our Proposal is absolutely correct to best of our knowledge and we accept full responsibility for its accuracy.

We understand that any false or incorrect data/ documents/ information may result in disqualification of our bid at any stage of procurement process.

Signature of Authorized Representative: _____

Name/Designation of Authorized Representative: _____

Designation of Authorized Representative: _____