



**KENYA CIVIL AVIATION AUTHORITY
P.O BOX 30163-00100
NAIROBI**

Email:- procurement@kcaa.or.ke

**INVITATION TO PRE-QUALIFICATION
TENDER NO. KCAA/041/2021-2022**

**PRE-QUALIFICATION FOR SUPPLY, DELIVERY,
CONFIGURATION, TESTING AND
COMMISSIONING OF AN UNMANNED AIRCRAFT
SYSTEMS TRAFFIC MANAGEMENT SYSTEM (UTM)**

DATE OF NOTICE: TUESDAY, 21ST DECEMBER 2021

CLOSING DATE: 18TH JANUARY 2022 AT 11:00 AM

All bidders must note that KCAA communicates only in writing to all interested bidders during the entire tendering process.

INVITATION TO APPLY FOR PREQUALIFICATION

Name of Contract: pre-qualification for supply, delivery, configuration, testing and commissioning of an Unmanned Aircraft Systems Traffic Management System (UTM)

Contract No: **KCAA/041/2021-2022**

Prequalification Reference No.: **KCAA/041/2021-2022**

The **Kenya Civil Aviation Authority** intends to prequalify Suppliers for **supply, delivery, configuration, testing and commissioning of an Unmanned Aircraft Systems Traffic Management System (UTM)**

1. **The objective of the assignment is to:-**

- The UTM system is aimed at enhancing aviation safety and security in the advent of Unmanned Aircraft Systems (UAS) Operations.
 - Following the promulgation and implementation of the Civil Aviation (Unmanned Aircraft Systems) Regulations 2020 and the increased interest in UAS operations of various types and for various purposes a UTM is necessary to enhance aviation safety and security while facilitating the integration of UAS operations in the airspace shared with conventional air traffic.
2. It is expected that the Invitation to Tender will be made in the month of **February 2022**. Tendering will be conducted through **restricted tender** procedures using a standardized tender document and will be open to all applicants who prequalify.
 3. Qualified and interested applicants may obtain further information and inspect the Prequalification Document during office hours 0900 to 1500 hours at the address given below.
 4. A complete set of Prequalification Document in English may be obtained by interested applicants free of charge.
 5. Prequalification Document may be viewed and downloaded for free from the website KCAA website: ***www.kcaa.or.ke*** or ***www.tenders.go.ke*** at no cost and immediately forward their particulars for records and for the purposes of receiving any further tender clarifications and/or addendums **procurement@kcaa.or.ke**.
 6. Applications for prequalification should be submitted by postal service, or hand/courier delivery, clearly marked envelopes and delivered to the address given below by 18th January 2022 at 11.00 AM.
 7. Late applications will be rejected.
 8. Address where to submit Applications
Director General
Kenya Civil Aviation Authority
Ground floor, Aviation House, Jomo Kenyatta International Airport:
P.O. Box 30163-00100 Nairobi

PART 1 - APPLICATION PROCEDURES

SECTION I - INSTRUCTIONS TO APPLICANTS (ITA)

A. General

1. Scope of Application

- 1.1 The name of the Procuring Entity inviting for applications is defined in the **PDS**. The particular type of contract (works, goods or Non-Consulting Services required) and its name and description of the contract(s) and its reference number are defined in the **PDS**. If the scope of contract so defined is in multiple contracts, it will be specified in the **PDS** if prequalification will be based on individual contracts or multiple contracts. The Full scope of Works or Goods or Non-Consulting Services are described in Section V (Scope of Works or goods contract).

- 2 **Source of Funds** to be specified in the PDS, if deemed necessary.

3. Fraud and Corruption

- 3.1 The Government of Kenya requires compliance with its Anti-Corruption laws and its prevailing sanctions policies and procedures.
- 3.2 In further pursuance of this policy, Applicants shall permit and shall cause their agents (where declared or not), subcontractors, sub consultants, service providers, suppliers, and their personnel, to permit the Public Procurement Regulatory Authority (PPRA) to inspect all accounts, records and other documents relating to any initial selection process, prequalification process, tender submission (incase prequalified), proposal submission, and contract performance (in the case of award), and to have them audited by auditors appointed by the PPRA.

4. Collusive practices

- 4.1 The Procuring Entity requires compliance with the provisions of the Competition Act 2010, regarding collusive practices in contracting. Any applicant found to have engaged in collusive conduct shall be disqualified and criminal and/or civil sanctions may be imposed. To this effect, applicants shall be required to complete and sign a Certificate of Independent Tender Determination” annexed to the Form of applicant.

5. Eligible Applicants

- 5.1 Applicants shall meet the eligibility criteria as per this ITA and ITA 5.1 and 5.2. An Applicant may be a firm that is a private entity, a state-owned enterprise or institution subject to ITA 5.9 or any combination of such entities in the form of a joint venture (“JV”) under an existing agreement or with the intent to enter into such an agreement supported by a letter of intent. In the case of a joint venture, all members shall be jointly and severally liable for the execution of the entire Contract in accordance with the Contract terms. The JV shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the members of the JV during the prequalification process, tendering (in the event the JV submits a Tender) and during contract execution (in the event the JV is awarded the Contract). Members of a joint venture may not also make an individual tender, be a subcontractor in a separate tender or be part of another joint venture for the purposes of the same Tender. The maximum number of JV members shall be specified in the PDS.
- 5.2 Public Officers of the Procuring Entity, their Spouses, Child, Parent, Brothers or Sister. Child, Parent, Brother or Sister of a Spouse, their business associates or agents and firms/organizations in which they have a substantial or controlling interest shall not be eligible to be prequalified. Public Officers with such relatives are also not allowed to participate in any procurement proceedings.
- 5.3 A firm may apply for prequalification both individually, and as part of a joint venture, or participate as a subcontractor. If prequalified, it will not be permitted to tender for the

same contract both as an individual firm and as a part of the joint venture or as a subcontractor. However, a firm may participate as a subcontractor in more than one Tender, but only in that capacity. Tenders submitted in violation of this procedure will be rejected.

5.4 A firm and any of its affiliates (that directly or indirectly control, are controlled by or are under common control with that firm) may submit its application for prequalification either individually, as joint venture or as a subcontractor among them for the same contract. However, if prequalified, only one prequalified Applicant will be allowed to tender for the. All Tenders submitted in violation of this procedure will be rejected.

5.5 An Applicant may have the nationality of any country, subject to the restrictions pursuant to ITA 5.1 and 5.2. An Applicant shall be deemed to have the nationality of a country if the Applicant is constituted, incorporated or registered in and operates in conformity with the provisions of the laws of that country, as evidenced by its articles of incorporation (or equivalent documents of constitution or association) and its registration documents, as the case may be. sub-contractors or suppliers for any part of the Contract including related Non-Consulting Services.

5.6 Applicants shall not have a conflict of interest. Applicants shall be considered to have a conflict of interest, if they, or any of their affiliates, participated as a consultant in the preparation of the design or technical specifications or have been hired or proposed to be hired by the Procuring Entity as Engineer for contract implementation of the contract(s) that are the subject of this prequalification. In addition, Applicants may be considered to have a conflict of interest if they have a close business or family relationship with a professional staff of the Procuring Entity who:

- a are directly or indirectly involved in the preparation of the prequalification Document or Invitation to Tender (ITT), Document or specifications of the Contract, and/or the Tender evaluation process of such Contract; or
- b would be involved in the implementation or supervision of such Contract, unless the conflict stemming from such relationship has been resolved in a manner acceptable to the Procuring Entity throughout the prequalification, ITT process and execution of the Contract.

5.7 An Applicant that has been debarred shall be ineligible to be initially selected for, prequalified for, tender for, propose for, or be awarded a contract during such period of time as the PPRA shall have determined. The list of debarred firms and individuals is available at www.ppra.go.ke

5.8 Applicants that are state-owned enterprise or institutions in Kenya may be eligible to prequalify, compete and be awarded a Contract(s) only if they can establish, in a manner acceptable to the Procuring Entity, that they (i) are legally and financially autonomous (ii) operate under commercial law, and (iii) are not under supervision of any public entity.

5.9 An Applicant shall not be under sanction of debarment from Tendering by the PPRA as the result of the execution of a Tender/Proposal–Securing Declaration.

5.10 An Applicant that is a Kenyan firm or citizen shall provide evidence of having fulfilled his/her tax obligations by producing a current tax clearance certificate or tax exemption certificate issued by the Kenya Revenue Authority.

5.11 An Applicant shall provide any other such documentary evidence of eligibility satisfactory to the Procuring Entity, as the Procuring Entity shall reasonably request.

6 Eligibility

6.1 Firms and individuals may be ineligible if they are nationals of ineligible countries as indicated herein. The countries, persons or entities are in eligible if:

- a. As a matter of law or official regulations, Kenya prohibits commercial relations with that country, or

- b. By an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, Kenya prohibits any import of goods or contracting of works or Non- Consulting Services from that country, or any payments to any country, person, or entity in that country.
- 6.2 When the Works, supply of Goods or provision of non-consulting services are implemented a cross jurisdictional boundary (and more than one country is a Procuring Entity, and is involved in the procurement), then exclusion of a firm or individual on the basis of ITA 5.1 (a) above by any country may be applied to that procurement across other countries involved, if the Procuring Entities involved in the procurement so agree.
- 6.3 Any goods, works and production processes with characteristics that have been declared by the relevant national environmental protection agency or by other competent authority as harmful to human beings and to the environment shall not be eligible for procurement.

B. Contents of the Prequalification Documents

7 Sections of Prequalification Document

- 7.1 This Prequalification Document consists of parts 1 and 2 which comprise all the sections indicated below, and which should be read in conjunction with any Addendum issued in accordance with ITA 8.

PART 1 - Prequalification Procedures

- i) Section I- Instructions to Applicants (ITA)
- ii) Section II - Prequalification Data Sheet (PDS)
- iii) Section III - Qualification Criteria and Requirements
- iv) Section IV- Application Forms

PART 2 - Works, Goods, or Non-Consulting Services Requirements

- i) Section VII- Scope of Works, Goods, or Non-Consulting Services
- 7.2 Unless obtained directly from the Procuring Entity, the Procuring Entity accepts no responsibility for the completeness of the document, responses to requests for clarification, the minutes of the pre-Application meeting (if any), or Addenda to the Prequalification Document in accordance with ITA 8. In case of any discrepancies, documents issued directly by the Procuring Entity shall prevail.
- 7.3 The Applicant is expected to examine all instructions, forms, and terms in the Prequalification Document and to furnish with its Application all information or documentation as is required by the Prequalification Document.

8 Clarification of Prequalification Documents, site visit(s) and Pre-Application Meeting

- 8.1 An Applicant requiring any clarification of the Prequalification Document shall contact the Procuring Entity in writing at the Procuring Entity's address indicated in the **PDS**. The Procuring Entity will respond in writing to any request for clarification provided that such request is received no later than fourteen (14) days prior to the deadline for submission of the applications. The Procuring Entity shall forward a copy of its response to all prospective Applicants who have obtained the Prequalification Document directly from the Procuring Entity, including a description of the inquiry but without identifying its source. If so indicated in the **PDS**, the Procuring Entity shall also promptly publish its response at the webpage identified in the **PDS**. Should the Procuring Entity deem it necessary to amend the Prequalification Document as a result of a clarification, it shall do so following the procedure under ITA 8. And in accordance with the provisions of ITA 17.2.

- 8.2 The Applicant, at the Applicant's own responsibility and risk, is encouraged to visit and examine and inspect the Site of the required contracts and obtain all information that may be necessary for preparing the application. The costs of visiting the Site shall be at the Applicant's own expense. The Procuring Entity shall specify in the **PDS** if a pre-application meeting will be held, when and where. The Procuring Entity shall also specify in the **PDS** if a pre-arranged Site visit will be held and when. The Applicant's designated representative is invited to attend a pre- application meeting and a pre-arranged site visit. The purpose of the meetings will be to clarify issues and to answer questions on any matter that may be raised at that stage.
- 8.3 The Applicant is requested to submit any questions in writing, to reach the Procuring Entity not later than the period specified in the **PDS** before the submission date of applications.
- 8.4 Minutes of a pre-arranged site visit and those of the pre-application meeting, if applicable, including the text of the questions asked by Applicants and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Applicants who have acquired the prequalification documents. Minutes shall not identify the source of the questions asked.
- 8.5 The Procuring Entity shall also promptly publish anonymized (*no names*) Minutes of the pre-arranged site visit and those of the pre-proposal meeting at the web page identified **in the PDS**. Any modification to the Prequalification Documents that may become necessary as a result of the pre-arranged site visit and those of the pre-application meeting shall be made by the Procuring Entity exclusively through the issue of an Addendum pursuant to PDS 8 and not through the minutes of the pre-application meeting. Non-attendance at the pre- arranged site visit and the pre-tender meeting will not be a cause for disqualification of a Tenderer.

9 Amendment of Prequalification Document

- 9.1 At any time prior to the deadline for submission of Applications, the Procuring Entity may amend the Prequalification Document by issuing an Addendum.
- 9.2 Any Addendum issued shall be part of the Prequalification Document and shall be communicated in writing to all Applicants who have obtained the Prequalification Document from the Procuring Entity. The Procuring Entity shall promptly publish the Addendum at the Procuring Entity's webpage identified in the PDS.
- 9.3 To give Applicants reasonable time to take an Addendum into account in preparing their Applications, the Procuring Entity may, at its discretion, extend the deadline for the submission of Applications in accordance with ITA 17.2.

C. Preparation of Applications

10 Cost of Applications

- 10.1 The Applicant shall bear all costs associated with the preparation and submission of its Application. The Procuring Entity will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the prequalification process.

11 Language of Application

- 11.1 The Application as well as all correspondence and documents relating to the prequalification exchanged by the Applicant and the Procuring Entity, shall be written in English Language. Supporting documents and printed literature that are part of the Application may be in another language, provided they are accompanied by an accurate translation of the relevant passages in the English language, in which case, for purposes of interpretation of the Application, the translation shall govern.

12 Documents Comprising the Application

12.1 The Application shall comprise the following:

- a. Application Submission Letter, in accordance with ITA 13.1;
- b. Eligibility: documentary evidence establishing the Applicant's eligibility, in accordance with ITA 14.1;
- c. Qualifications: documentary evidence establishing the Applicant's qualifications, in accordance with ITA 15; and
- d. Any other document required as specified in the PDS.

12.2 The Applicant shall furnish information on commissions and gratuities, if any, paid or to be paid to agents or any other party relating to this Application.

13 Application Submission Letter

13.1 The Applicant shall complete an Application Submission Letter as provided in Section IV (Application Forms). This Letter must be completed without any alteration to its format.

14 Documents Establishing the Eligibility of the Applicant

14.1 To establish its eligibility in accordance with ITA 4, the Applicant shall complete the eligibility declarations in the Application Submission Letter and Forms ELI (eligibility) 1.1 and 1.2, included in Section IV (Application Forms).

15 Documents Establishing the Qualifications of the Applicant

15.1 To establish its qualifications to perform the contract(s) in accordance with Section III, Qualification Criteria and Requirements, the Applicant shall provide the information requested in the corresponding Information Sheets included in Section IV (Application Forms).

15.2 Wherever an Application Form requires an Applicant to state a monetary amount, Applicants should indicate the Kenya Shilling equivalent using the rate of exchange determined as follows:

- a For construction turnover or financial data required for each Year-Exchange rate prevailing on the last day of the respective calendar year (in which the amounts for that year is to be converted).
- b Value of single Contract-Exchange rate prevailing on the date of the contract.

15.3 Exchange rates shall be taken from the publicly available source identified in the PDS. Any error in determining the exchange rates in the Application may be corrected by the Procuring Entity.

15.4 Applicants shall be asked to provide, as part of the data for qualification, such information, including details of ownership, as shall be required to determine whether, according to the classification established by the Procuring Entity, a particular contractor or group of contractors qualifies for a margin of preference. Further the information will enable the Procuring Entity identify any actual or potential conflict of interest in relation to the procurement and/or contract management processes, or a possibility of collusion between Applicants, and thereby help to prevent any corrupt influence in relation to the procurement processor contract management.

15.5 The purpose of the information described in ITT 6.2 above overrides any claims to confidentiality which an Applicant may have. There can be no circumstances in which it would be justified for an Applicant to keep information relating to its ownership and control confidential where it is tendering to undertake public sector work and receive public sector funds. Thus, confidentiality will not be accepted by the Procuring Entity as a justification for an Applicant's failure to disclose, or failure to provide required information on its ownership and control.

- 15.6 The Applicant shall provide further documentary proof, information or authorizations that the Procuring Entity may request in relation to ownership and control which information on any changes to the information which was provided by the Applicant under ITT 6.3. The obligations to require this information shall continue for the duration of the procurement process and contract performance and after completion of the contract, if any change to the information previously provided may reveal a conflict of interest in relation to the award or management of the contract.
- 15.7 All information provided by the Applicant pursuant to these requirements must be complete, current and accurate as at the date of provision to the Procuring Entity. In submitting the information required pursuant to these requirements, the Applicant shall warrant that the information submitted is complete, current and accurate as at the date of submission to the Procuring Entity.
- 15.8 If an Applicant fails to submit the information required by these requirements, its application will be rejected. Similarly, if the Procuring Entity is unable, after taking reasonable steps, to verify to a reasonable degree the information submitted by an Applicant pursuant to these requirements, then the application will be rejected.
- 15.9 If information submitted by an Applicant pursuant to these requirements, or obtained by the Procuring Entity (whether through its own enquiries, through notification by the public or otherwise), shows any conflict of interest which could materially and improperly benefit the Applicant in relation to the procurement or contract management process, then:
- a. If the procurement process is still ongoing, the Applicant will be disqualified from the procurement process,
 - b. If the contract has been awarded to that Applicant, the contract award will be set aside,
- 15.10 the Applicant will be referred to the relevant law enforcement authorities for investigation of whether the Applicant or any other persons have committed any criminal offence.
- 15.11 If an Applicant submits information pursuant to these requirements that is incomplete, inaccurate or out-of-date, or attempts to obstruct the verification process, then the consequences ITT 6.7 will ensue unless the Applicant can show to the reasonable satisfaction of the Procuring Entity that any such act was not material, or was due to genuine error which was not attributable to the intentional act, negligence or recklessness of the Applicant.

16 Signing of the Application and Number of Copies

- 16.1 The Applicant shall prepare one original of the documents comprising the Application as described in ITA 11 and clearly mark it "ORIGINAL". The original of the Application shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Applicant. In case the Applicant is a JV, the Application shall be signed by an authorized representative of the JV on behalf of the JV and so as to be legally binding on all the members as evidenced by a power of attorney signed by their legally authorized signatories.
- 16.2 The Applicant shall submit copies of the signed original Application, in the number specified in the PDS, and clearly mark them "COPY". In the event of any discrepancy between the original and the copies, the original shall prevail.

D. Submission of Applications

17 Sealing and Marking of Applications

- 17.1 The Applicant shall enclose the original and the copies of the Application in a sealed envelope that shall:
- a. Bear the name and address of the Applicant;
 - b. Be addressed to the Procuring Entity, in accordance with ITA 17.1; and
 - c. Bear the specific identification of this prequalification process indicated in the PDS 1.1.

- 17.2 The Procuring Entity will accept no responsibility for not processing any envelope that was not identified as required in ITA 16.1 above.

18 Deadline for Submission of Applications

- 18.1 Applicants may either submit their Applications by mail or by hand. Applications shall be received by the Procuring Entity at the address and no later than the deadline indicated in the PDS. When so specified in the PDS, Applicants have the option of submitting their Applications electronically, in accordance with electronic Application submission procedures specified in the **PDS**.

- 18.2 The Procuring Entity may, at its discretion, extend the deadline for the submission of Applications by amending the Prequalification Document in accordance with ITA 8, in which case all rights and obligations of the Procuring Entity and the Applicants subject to the previous deadline shall thereafter be subject to the deadline as extended.

19 Late Applications

- 19.1 The Procuring Entity reserves the right to accept applications received after the deadline for submission of applications, unless otherwise specified in the **PDS**. If late applications will be accepted, they must be received not later than the date specified in the **TDS** after the deadline for submission of applications.

20. Opening of Applications

- 20.1 The Procuring Entity shall open all Applications at the date, time and place specified in the **PDS**. Late Applications shall be treated in accordance with ITA 19.1.
- 20.2 Applications submitted electronically (if permitted pursuant to ITA 17.1) shall be opened in accordance with the procedures specified in the **PDS**.
- 20.2 The Procuring Entity shall prepare a record of the opening of Applications to include, as a minimum, the name of the Applicants. A copy of the record shall be distributed to all Applicants.

E. Procedures for Evaluation of Applications

21 Confidentiality

- 21.1 Information relating to the Applications, their evaluation and results of the prequalification shall not be disclosed to Applicants or any other persons not officially concerned with the prequalification process until the notification of prequalification results is made to all Applicants in accordance with ITA 28.
- 21.2 From the deadline for submission of Applications to the time of notification of the results of the prequalification in accordance with ITA 28, any Applicant that wishes to contact the Procuring Entity on any matter related to the prequalification process may do so only in writing.

22 Clarification of Applications

- 22.1 To assist in the evaluation of Applications, the Procuring Entity may, at its discretion, ask an Applicant for a clarification (including missing documents) of its Application, to be submitted within a stated reasonable period of time. Any request for clarification from the Procuring Entity and all clarifications from the Applicant shall be in writing.
- 22.1 If an Applicant does not provide clarifications and/or documents requested by the date and time set in the Procuring Entity's request for clarification, its Application shall be evaluated based on the information and documents available at the time of evaluation of the Application.

23 Responsiveness of Applications

- 23.1 The Procuring Entity may reject any Application which is not responsive to the requirements of the Prequalification Document. In case the information furnished by the Applicant is incomplete or otherwise requires clarification as per ITA 21.1, and the Applicant fails to provide satisfactory clarification and/or missing information, it may result in disqualification of the Applicant.

24 Margin of Preference

- 24.1 Unless otherwise specified in the **PDS**, a margin of preference shall not apply in the Tendering process resulting from this prequalification.

25 Nominated Subcontractors

- 25.1 Unless otherwise stated in the PDS, the Procuring Entity does not intend to execute any specific elements of the works by sub-contractors selected in advance by the Procuring Entity (so-called “Nominated Subcontractors”).
- 25.2 The Applicant shall not propose to subcontract the whole of the Works or Goods. The maximum limit of subcontracting permitted under the contract may be specified by the Procuring Entity in the Tendering Document. The Procuring Entity, in ITA 25.2, may permit the Applicant to propose subcontractors for certain specialized parts of the contract as indicated there in as (“Specialized Subcontractors”). Applicants planning to use such Specialized Subcontractors shall specify, in the Application Submission Letter, the activity(ies) or parts of the Works proposed to be subcontracted along with details of the proposed subcontractors including their qualification and experience.

F. Evaluation of Applications and Prequalification of Applicants

26 Evaluation of Applications

- 26.1 The Procuring Entity shall use the factors, methods, criteria, and requirements defined in Section III, Qualification Criteria and Requirements, to evaluate the qualifications of the Applicants, and no other methods, criteria, or requirements shall be used. The Procuring Entity reserves the right to waive min or deviations from the qualification criteria if they do not materially affect the technical capability and financial resources of an Applicant to perform the Contract.
- 26.2 Subcontractors proposed by the Applicant shall be fully qualified and meet the minimum specific experience criteria as specified for their parts of the proposed contract for Works or Goods or non-consulting services. The subcontractor's qualifications shall not be used by the Applicant to qualify for the Works or Goods or non- consulting services unless their parts of the Works or Goods or non-consulting services were previously designated by the Procuring Entity in the PDS as can be met by Specialized Subcontractors, in which case:
- i) The Specialized Subcontractors shall meet the minimum qualification requirements specified in Section III, and
 - ii) the qualifications with respect to specific experience of the Specialized Subcontractor proposed by the Applicant may be added to the qualifications of the Applicant for the purpose of the evaluation.
- Unless the Applicant has been determined prequalified on its own without taking into account the qualification and experience of the proposed specialized sub-contractor, the tender submitted by the Applicant shall include the same specialized sub-contractor failing which, such tender may be rejected unless a change in the specialized sub-contractor was requested by the Applicant and approved by the Procuring Entity subsequent to prequalification but before the tender submission deadline in accordance with ITA 30.
- 26.3 In case of multiple contracts, Applicants should indicate in their Applications the individual contract or combination of contracts in which they are interested. The Procuring Entity shall prequalify each Applicant for each lot and for a combination of

contracts for which the Applicant has thereby indicated its interest and for which the Applicant meets the appropriate aggregate requirements the Eligibility and Qualification Criteria.

- 26.4 Further, in the case of multiple contracts, the Procuring Entity will prepare the Eligibility and Qualification Criteria Form for items 3.1, 3.2, 4.2(a) and 4.2(b) for each Lot, to be completed by applicants.
- 26.5 Only the qualifications of the Applicant shall be considered. The qualifications of other firms, including the Applicant's subsidiaries, parent entities, affiliates, subcontractors (other than Specialized Subcontractors in accordance with ITA 25.2 above) or any other firm(s) different from the Applicant shall not be considered.

27 Procuring Entity's Right to Accept or Reject Applications

- 27.1 The Procuring Entity reserves the right to accept or reject any Application, and to annul the prequalification process and reject all Applications at any time, without thereby incurring any liability to the Applicants.

28 Prequalification of Applicants

- 28.1 All Applicants whose Applications substantially meet or exceed the specified qualification requirements will be prequalified by the Procuring Entity. The Procuring Entity shall notify all Applicants in writing of the names of those Applicants who have been prequalified or conditionally prequalified. In addition, those Applicants who have been disqualified will be informed separately.
- 28.32 Applicants that have not been prequalified may write to the Procuring Entity to request, in writing, the grounds on which they were disqualified.

28 Invitation to Tender

- 29.1 Promptly after the notification of the results of the prequalification, the Procuring Entity shall invite Tenders from all the Applicants that have been prequalified or conditionally prequalified.
- 28.2 Applicants may be required to provide a Tender Security or a Tender-Securing Declaration acceptable to the Procuring Entity in the form and an amount to be specified in the tendering document.
- 28.3 The successful Applicant shall be required to provide a Performance Security as specified in the tendering document.

29 Changes in Qualifications of Applicants

- 30.1 Any change in the structure or formation of an Applicant after being prequalified in accordance with ITA 27 and invited to tender (including, in the case of a JV, any change in the structure or formation of any member and also including any change in any specialized subcontractor whose qualifications were considered to prequalify the Applicant) shall be subject to the written approval of the Procuring Entity prior to the deadline for submission of Tenders. Such approval shall be denied if (i) a prequalified applicant proposes to associate with a disqualified applicant or in case of a disqualified joint venture, any of its members; (ii) as a consequence of the change, the Applicant no longer substantially meets the qualification criteria set forth in Section III (Qualification Criteria and Requirements); or (iii) in the opinion of the Procuring Entity, the change may result in a substantial reduction in competition. Any such change should be submitted to the Procuring Entity not later than fourteen (14) days after the date of the Invitation to Tender.

31 Procurement Related Complaints

- 31.1 The procedures for making a Procurement-related Complaint are as specified in the PDS.

SECTION II - PREQUALIFICATION DATA SHEET (PDS)

A. General	
ITA 1.1	<p>The Procuring Entity is: KENYA CIVIL AVIATION AUTHORITY</p> <p>The identification of the Invitation for pre-qualification is: KCAA/041/2021-2022.</p> <p>PRE-QUALIFICATION FOR SUPPLY, DELIVERY, CONFIGURATION, TESTING AND COMMISSIONING OF AN UNMANNED AIRCRAFT SYSTEMS TRAFFIC MANAGEMENT SYSTEM (UTM)</p> <p>The particular type of the contract will cover the following areas:-</p> <ul style="list-style-type: none"> ➤ THE UTM IS MEANT FOR UNCONTROLLED UAS OPERATIONS THAT IS SEPARATE FROM, BUT COMPLEMENTARY TO, THE CONVENTIONAL AIR TRAFFIC MANAGEMENT (ATM) SYSTEM. THE UTM IS EXPECTED TO ULTIMATELY IDENTIFY SERVICES, ROLES AND RESPONSIBILITIES, INFORMATION ARCHITECTURE, DATA EXCHANGE PROTOCOLS, SOFTWARE FUNCTIONS, INFRASTRUCTURE, AND PERFORMANCE REQUIREMENTS FOR ENABLING THE MANAGEMENT OF LOW-ALTITUDE UNCONTROLLED DRONE OPERATIONS. ➤ THE UTM IS EXPECTED TO ENABLE MONITORING OF MULTIPLE DRONE OPERATIONS CONDUCTED WITHIN VISUAL LINE-OF-SIGHT (VLOS), EXTENDED VISUAL LINE-OF-SIGHT (EVLOS) AND BEYOND VISUAL LINE-OF-SIGHT (BVLOS), WHERE AIR TRAFFIC SERVICES ARE EITHER PROVIDED OR NOT. THE UTM WILL BE EXPECTED TO BE A COMPLEMENTARY SYSTEM AND THUS FACILITATE THE IDENTIFICATION OF UAS OPERATIONS IN GIVEN AREAS AND FACILITATE ATM TO TAKE NECESSARY ACTION TO PRESERVE SAFETY OF AIR NAVIGATION. ➤ UTM SYSTEMS ARE THEREFORE ENVISAGED TO BE INTEROPERABLE AND CONSISTENT WITH EXISTING ATM SYSTEMS IN ORDER TO FACILITATE SAFE AND EFFICIENT OPERATIONS. <p>The application is for: _SUPPLY, DELIVERY, CONFIGURATION, TESTING AND COMMISSIONING OF AN UNMANNED AIRCRAFT SYSTEMS TRAFFIC MANAGEMENT SYSTEM (UTM)</p> <p>Prequalification will be based on: INDIVIDUAL CONTRACT.</p>
ITA 2	<p>The source of funds shall be : KENYA CIVIL AVIATION AUTHORITY INTERNAL FUNDING</p>
ITA 5.2	<p>Maximum number of members in a JV shall be: 3.</p>

B. Contents of the Prequalification Document	
ITA 8.1	<p>For clarification purposes, the Procuring Entity address is:</p> <p style="text-align: center;">KENYA CIVIL AVIATION AUTHORITY PROCUREMENT OFFICE, GROUND FLOOR, AVIATION HOUSE, JOMO KENYATTA INTERNATIONAL AIRPORT: P.O. BOX 30163-00100 NAIROBI EMAIL: PROCUREMENT@KCAA.KE TEL:- 020827470-5, +254 709725000 P.O BOX 30163-00100, NAIROBI</p>
ITA 8.2	<p>A pre-application meeting will be held on: ____ N/A.</p> <p>A pre-arranged site visit will be held on: ____ N/A.</p>
ITA 8.3	Questions and requests for clarification made in writing or by email shall reach the procuring entity not later than:
ITA 8.5	Minutes of the pre-arranged site visit and those of the pre-proposal meeting at the web page: www.kcaa.or.ke
ITA 9.2	Addendum issued shall be published at the website: www.kcaa.or.ke
C. Preparation of Applications	
ITA 12.1 (d)	The applicant shall submit with its application, the following additional documents:
ITA 15.2 (b)	The source of determining exchange rate is: CENTRAL BANK OF KENYA
ITA 16.2	In addition to the original, the number of copies to be submitted with the Application is: ONE
D. Submission of Applications	
ITA 17.1	<p>The deadline for Application submission is:</p> <p>18TH JANUARY 2022</p> <p>Time: 11:00am</p> <p>For Application submission only, the Procuring Entity address is:</p> <p>Attention: DIRECTOR GENERAL</p> <p>Address: GROUND FLOOR, AVIATION HOUSE, JOMO KENYATTA INTERNATIONAL AIRPORT; P.O. BOX 30163-00100 NAIROBI</p> <p>County: KENYA</p> <p>Telephone: 020827470-5, +254 709725000</p> <p>Email: procurement@kcaa.or.ke</p> <p>Applicants shall not have the option of submitting their Applications electronically.</p>

ITA 18.1	Late Applications will be returned unopened to the Applicants.
ITA 19.1	The procuring Entity WILL NOT accept late Applications
ITA 20.1	The opening of the Applications shall be at: KENYA CIVIL AVIATION AUTHORITY, AUDITORIUM, GROUND FLOOR, AVIATION HOUSE, JOMO KENYATTA INTERNATIONAL AIRPORT
E. Procedure for Evaluation of Applications	
ITA 24.1	A margin of preference SHALL NOT apply
ITA 25.1	At this time the Procuring Entity DOES NOT intend to execute certain specific parts of the works by contractors selected in advance.
ITA 31.1	<p>An Applicant wishes to make a Procurement-related Complaint; the Applicant should submit its complaint in writing to:</p> <p>For the attention: DIRECTOR GENERAL</p> <p>Title/ Position: DIRECTOR GENERAL</p> <p>Procuring Entity: KENYA CIVIL AVIATION AUTHORITY</p> <p>Email address: info@kcaa.or.ke</p>

SECTION III - QUALIFICATION CRITERIA AND REQUIREMENTS

PART A: PRELIMINARY EVALUATION CRITERIA

No	Preliminary mandatory Requirement
1.	Duly filled Applicant Information Form and provide copies of the Certificate of Registration /Incorporation showing the owners and directors of the Firm
2.	Provide copy of the company Valid Tax Compliance certificate or equivalent country of origin documents
3.	The bidder shall provide two hard copies marked Original and Copy and a soft copy in a well-marked Flash Drive
4.	Duly filled and signed Application submission letter to confirm any Conflict of interest
5.	Eligibility of the bidder as per ITA 5 and 6
6.	Not having been excluded as a result of prohibition in the laws of Kenya or official regulations against commercial relations with Kenya, or by an act of compliance with UN security council resolution
7.	Provide details of previous contracts terminated or delayed beyond the intended completion date and duly fill form CON 2
8.	Not under suspension based on execution of a tender / proposal securing declaration
9.	Litigation history and duly fill form CON 2
10.	Demonstrate that Applicant has access to, or has available, liquid assets, unencumbered real assets, lines of credit, and other financial means (independent of any contractual advance payment) sufficient to meet the contract cash flow requirements estimated as Kenya Shillings One Hundred Million (Kshs 100 Million) for the subject contract(s) net of the Applicants other commitments
11.	The Applicant shall also demonstrate, to the satisfaction of the Procuring Entity, that it has adequate sources of finance to meet the cash flow requirements on contracts currently in progress and for future contract commitments.
12.	Submit audited financial statements for the last Three years and must demonstrate the current soundness of the Applicant's financial position and indicate its prospective long-term profitability.
13.	The bidder MUST be the OEM of the solution they are providing. Copies of ownership and supporting documentation must be provided. Attach documentary evidence
14.	<p>The vendor MUST have successfully implemented at least one (1) UTM solutions over the past five (5) years. The following is required: -</p> <ul style="list-style-type: none"> i. The Organizations, addresses and locations where the systems' have been implemented. ii. Copies of Orders/Contracts to be provided with their requisite completion certificates/user acceptance documentation. iii. Contact persons and their email address. iv. The web links of the implemented systems. <p>At least one project implemented in a country outside the state of manufacture of the UTM system</p>
15.	<p>The vendor must have at least Two (2) Engineers trained and experienced in implementation of UTM systems.</p> <ul style="list-style-type: none"> i. Attach CVs and copies of certificates. ii. Attach documentation for sites implemented by the respective Engineers. <p>The engineers proposed here MUST be the engineers who will implement the project. This information should be available in the Project Team composition.</p>

No	Preliminary mandatory Requirement
16.	<p>The vendor must have at least One (1) Engineers trained and experienced in deployment of physical servers, virtualization using VMware, replication using EMC's Recover Point and related configurations.</p> <p>i. Attach CVs. ii. Attach copies of certificates showing knowledge of VMware. iii. Attach documentation for sites implemented by the respective Engineers.</p> <p>The engineers proposed here MUST be the engineers who will implement the project. This information should be available in the Project Team composition.</p>
17.	<p>i. The supplier shall provide a list of all critical system spares which will be supplied with the equipment to sustain the system during the three (3) year warranty period. ii. Tenderer shall provide a written commitment to guarantee availability of spare parts or to repair the equipment under offer for a period of at least ten (10) years after end of warranty. The Tenderer shall provide written assurance that they can guarantee full operations of the system for the next ten (10) years</p>

PART B: MANDATORY TECHNICAL EVALUATION CRITERIA

- All the technical documentation is mandatory. The bidder MUST provide detailed explanations of how they shall fully meet the required technical documentation.
- Bidders SHALL NOT write complied or just tick (✓) against a requirement, a full detailed explanation is required.

No	Item/Specification	Requirement	Bidder's response
18.	Soft copy of the Bidding Document	The bidder MUST also provide a soft copy of the bidding documents in a marked flash drive	
19.	Original Equipment Manufacturer/ Developer	The bidder MUST provide documentation showing that they are the Original Equipment Manufacturer's of the UTM System	
20.	Proof of Physical Location of the Business and Factory/Technical Operations Base	The bidder shall provide proof of occupation the business premises and the factory/technical base. The proof should be leases or ownership documentation or any other applicable and acceptable documentation.	
21.	Vendor's Experience in implementation of UTM Solutions	<p>Demonstrate that the firm has experience of having successfully completed UTM Systems in at least three (3) other organizations one of which MUST be a Civil Aviation Oversight Authority. The following information should be provided for each of the reference sites: -</p> <p>i. Name and location of the organization ii. Contact information including details of the contact person, email address and telephone number(s) iii. Copy of signed contract/documentation e.g. Purchase Orders or contract snippets iv. Respective completion/commissioning/user-acceptance documentation for each of the projects v. Online links of the implemented systems</p>	

No	Item/Specification	Requirement	Bidder's response
22.	Virtual Tour of the UTM System	The bidder shall provide at least a ten (10) minutes recording of their UTM System illustrating all the features and operational setup including command centres	
23.	Staff Competence in UTM Solutions	Demonstrate that the firm has at least four (4) experienced engineers who have participated in successfully completed implementation of UTM Systems/ ATM Systems in at least three (3) other organizations one of which MUST be a Civil Aviation Oversight Authority. The following information should be provided for each of the reference sites: - i. Detailed CVs of each of the four (4) Engineers ii. Systems they have implemented and names and locations of the organization iii. Copies of professional certificates	
24.	Staff Competence in Servers and virtualization	The vendor must have at least two (2) Engineers trained and experienced in deployment of physical servers, virtualization using VMware, replication using EMC's Recover Point and related configurations. For each of the Engineers: - iv. Attach CVs. v. Attach copies of certificates showing knowledge of VMware. vi. Attach documentation for sites implemented by the respective Engineers. The engineers proposed here MUST be the engineers who will implement the project. This information should be available in the Project Team composition.	
25.	Spares and Guarantees	iii. The supplier shall provide a list of all critical system spares which will be supplied with the equipment to sustain the system during the three (3) year warranty period. iv. Tenderer shall provide a written commitment to guarantee availability of spare parts or to repair the equipment under offer for a period of at least ten (10) years after end of warranty. v. The Tenderer shall provide written assurance that they can guarantee full operations of the system for the next ten (10) years	
26.	Technical Framework Design	The bidder shall provide a technical framework design of their UTM illustrating the following: - i. Core UTM infrastructure ii. Operations and Command Centre iii. End-Users iv. Interconnectivity/communications with UASs v. Interconnectivity/communications with UASs vi. Interconnectivity/communications with UAS-Jamming and Counter-UAS systems	
27.	Core Infrastructure Design	The bidder shall provide a technical framework design of their core infrastructure illustrating the following: - i. All Servers and their respective capacity in terms of OS, memory, storage and processors	

No	Item/Specification	Requirement	Bidder's response
		ii. Virtualization where applicable iii. Databases iv. Webservers v. Load balancers vi. Backups and disaster recovery vii. Any other critical core infrastructure viii. SAN and storage arrays – where applicable	
28.	Project Implementation Schedule and Methodology	The bidder shall provide a detailed project methodology with the following: - i. Project tasks and respective timelines ii. Full project timetable and completion dates iii. System analysis methodology iv. Technical staff training proposals v. End-user training proposals	
29.	Brochure	Include detailed brochures and datasheets of the bidder's UTM	

PART C: TECHNICAL REQUIREMENTS EVALUATION CRITERIA

- All the technical requirements are scored. Bidders should demonstrate the extent to which their UTM System meets or exceeds these requirements. The bidder **MUST** provide detailed explanations.
- Bidders should **NOT** write complied or just tick (✓) against a requirement, a full detailed explanation is required.

No	Item/Specification	Requirement	Score	Bidder's response
1.	User Management	How the UTM undertakes user management including integration with AD and other user management platforms. Use screenshots from the system.	2	
2.	Configuration & Customization Panel	For Customization and management of settings data. These configurations entail the following: - i. Devices ii. Organizations iii. Individuals iv. Other key configurations Use screenshots from the system.	2	
3.	System Modules	A brief description each of the modules implemented in the proposed system. All the supported system modules should also be depicted in the earlier requested virtual tour.	15	
4.	Flight Requests	Demonstrate how the UTM undertakes flight requests. Use screenshots from the system.	4	
5.	Geo Engine & Airspace Management	How the UTM incorporates Geo Engine & Airspace Management. Use screenshots from the system.	5	
6.	Flight Management	This shall include planned flights, active flights, operated flights, canceled flights amongst others. Use screenshots from the system.	4	
7.	Real-Time Traffic Monitoring and Surveillance	i. Real-Time Traffic Monitoring and Surveillance ii. Recording and review of Traffic Movements iii. Use screenshots from the system.	9	
8.	Transponders	i. Retrofitted into UASs ii. Indicate transponder communication technologies supported iii. Indicate transponder specifications iv. Indicate reported parameters	9	
9.	Deconfliction Module/Detect and avoid	i. Provide details of Deconfliction Module/Detect and avoid ii. Include information about risk management	4	
10.	Communications & Alerts Module	Provide available communications and alerts e.g. GSM, email, WhatsApp etc.	4	
11.	Digital Surface Modelling	Provide details of Digital Surface Modelling. Use screenshots from the system.	4	

No	Item/Specification	Requirement	Score	Bidder's response
12.	Emergencies	How the UTM undertakes Emergencies Management	2	
13.	Digital Logbook	Availability of a Digital Logbook	2	
14.	Reporting and Analytics	Types of available Reporting and Analytics	2	
15.	Integrations	Ways of integrating with other systems. Does the system support integration? What types of integration are supported?	4	
16.	UTM Operations Command Centre	Include possible configurations of a UTM command Centre showing Panels, Desks/Tables, chairs and user positions.	6	
17.	Cybersecurity	Explain how the bidder's UTM and related infrastructure manages Cybersecurity	4	
18.	Licensing Framework	What are the Licensing Frameworks available for the bidder's UTM	2	
19.	Flight Planning and Billing	Flight Planning and ANS Billing for BVLOS Operations. Use screenshots from the system.	2	
20.	Demonstration of bidder's understanding and capability to undertake the project	Detailed description and designs of bidders' understanding of the assignment, how the bidder proposes to undertake the assignment and expected components of the project as per the scope above. <i>NB: The bidder should propose a phased implementation approach</i>	4	
21.	On-premises vs On-cloud	State whether the solution is on-premises or on-cloud	2	
22.	Web-based	The proposed solution must be web-based. Describe the technologies behind the proposed solution. Use screenshots from the system.	2	
23.	Mobility	Indicate whether the solution has mobile applications, the platforms supported, the features in the mobile applications and security enforce in the mobile applications. Use screenshots from the system.	2	
24.	Introduction and confirmation of technical capability, reliability and guarantees of good performance.	Attach at least three (3) letters of recommendations of good performance and guarantees from clients. At least one of the clients MUST be a Civil Aviation Regulatory Safety and Security Oversight Organization	4	
Total			100%	

▪ **Note:**

Bidders will be required to demonstrate in detail including providing any documentary evidence on how they will meet the requirement as indicated below. Scores will be awarded per criteria and those who attain a score of 70% and above will be prequalified to submit tenders.

SECTION IV- APPLICATION FORMS

1. Application Submission Letter

Date:[insert day, month, and year]

ITT No. and title: [insert ITT number and title]

To:[insert full name of Procuring Entity] We, the undersigned, apply to be prequalified for the referenced ITT and declare that:

- a) No reservations: We have examined and have no reservations to the Prequalification Document, including Addendum(s) No(s), issued in accordance with ITA 8: [insert the number and issuing date of each addendum].
- b) No conflict of interest: We have no conflict of interest in accordance with ITA 5.7;
- c) Eligibility: We (and our subcontractors) meet the eligibility requirements as stated ITA 5, we have not been suspended by the Procuring Entity based on execution of a Tender/Proposal-Securing Declaration in accordance with ITA 5.8;

Suspension and Debarment: We, along with any of our subcontractors, suppliers, consultants, manufacturers, or service providers for any part of the contract, are not subject to, and not controlled by any entity or individual that is subject to, a temporary suspension or a debarment imposed by the PPRA. Further, we are not ineligible under the Kenya laws or official regulations or pursuant to a decision of the United Nations Security Council;

State-owned enterprise or institution: [select the appropriate option and delete the other] [We are not a state-owned enterprise or institution] / [We are a state-owned enterprise or institution but meet the requirements of ITA5.9];

- f) Subcontractors and Specialized Subcontractors: We, in accordance with ITA 24.2 and 25.2, plan to subcontract the following key activities and/or parts of the works or supply contracts:
[Insert any of the key activities identified in Section III-4.2 (a) or (b) or 4.3(a) or (b) which the Procuring Entity has permitted under the Prequalification Document and which the Applicant intends to subcontract along with complete details of the Specialized Subcontractors, their qualification and experience]
- (g) Commissions, gratuities, fees: We declare that the following commissions, gratuities, or fees have been paid or are to be paid with respect to the prequalification process, the corresponding Tendering process or execution of the Contract:

<u>Name of Recipient</u>	<u>Address</u>	<u>Reason</u>	<u>Amount</u>
[insert full name for each occurrence]	[insert street/ number/city/country]	[indicate reason]	[specify amount currency, value, exchange rate and KENYA SHILLING equivalent]
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

[If no payments are made or promised, add the following statement: "No commissions or gratuities have been or are to be paid by us to agents or any third party relating to this Application"]

- (h) Not bound to accept: We understand that you may cancel the prequalification process at any time and that you are neither bound to accept any Application that you may receive nor to invite the prequalified Applicants to Tender for the contract subject of this Prequalification process, without incurring any liability to the Applicants, in accordance with ITA 26.1.
- (i) True and correct: All information, statements and description contained in the Application are in all respect true, correct and complete to the best of our knowledge and belief.

Signed.....*[insert signature(s) of an authorized representative(s) of the Applicant]*

Name*[insert full name of person signing the Application]*

In the capacity of *[insert capacity of person signing the Application]*

Duly authorized to sign the Application for and on behalf of: Applicant's

Name..... *[insert full name of Applicant or the name of the JV]*

Address *[insert street number/town or city/country address]*

Dated on*[insert day number]* day of *[insert month]*, *[insert year]*

[For a joint venture, either all members shall sign or only the authorized representative, in which case the power of attorney to sign on behalf of all members shall be attached]

2 Form ELI -1.1 - Applicant Information Form

Date: *[insert day, month, year]*

ITT No. and title: *[insert ITT number and title]*

Page.....*[insert page number]* of *[insert total number]* pages

Applicant's name <i>[insert full name]</i>
In case of Joint Venture (JV), name of each member: <i>[insert full name of each member in JV]</i>
Applicant's actual or intended country of registration: <i>[indicate country of Constitution]</i>
Applicant's actual or intended year of incorporation: <i>[indicate year of Constitution]</i>
Applicant's legal address[in country of registration]: <i>[insert street/ number/ town or city/ country]</i>
Applicant's authorized representative information Name: <i>[insert full name]</i> Address: <i>[insert street/ number/ town or city/ country]</i> Telephone/Fax numbers: <i>[insert telephone/fax numbers, including country and city codes]</i> E-mail address: <i>[indicate e-mail address]</i>
1. Attached are copies of original documents of <input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above, in accordance with ITA 5.6. <input type="checkbox"/> In case of JV, letter of intent to form JV or JV agreement, in accordance with ITA 5.3. <input type="checkbox"/> In case of state-owned enterprise or institution, in accordance with ITA 5.9documents establishing: •Legal and financial autonomy •Operation under commercial law •Establishing that the Applicant is not under supervision of the Procuring Entity 2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

3. Form ELI-1.2 - Applicant's JV Information Form

[The following form is additional to Form ELI-1.1., and shall be completed to provide information relating to each JV member (incase the Applicant is a JV) as well as any Specialized Subcontractor proposed to be used by the Applicant for any part of the Contract resulting from this prequalification]

Date: *[insert day, month, year]*

ITT No. and title: *[insert ITT number and title]*

Page.....*[insert page number]* of *[insert total number]* pages

Applicant name: <i>[insert full name]</i>
Applicant's JV Member's name: <i>[insert full name of Applicant's JV Member]</i>
Applicant's JV Member's country of registration: <i>[indicate country of registration]</i>
Applicant JV Member's year of constitution: <i>[indicate year of constitution]</i>
Applicant JV Member's legal address in country of constitution: <i>[insert street/ number/ town or city/ country]</i>
Applicant JV Member's authorized representative information Name: <i>[insert full name]</i> Address: <i>[insert street/ number/ town or city/ country]</i> Telephone/Fax numbers: <i>[insert telephone/fax numbers, including country and city codes]</i> E-mail address: <i>[indicate e-mail address]</i>
1. Attached are copies of original documents of <input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above, in accordance with ITA 5.6 <input type="checkbox"/> In case of a state-owned enterprise or institution, documents establishing legal and financial autonomy, operation in accordance with commercial law, and they are not under the supervision of the Procuring Entity, in accordance with ITA 5.9. 2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

4. Form CON 2 - Historical Contract Non-Performance, and Pending Litigation and Litigation History

[The following table shall be filled in for the Applicant and for each member of a Joint Venture]

Applicant's Name:.....*[insert full name]*

Date:.....*[insert day, month, year]*

Joint Venture Member's Name:..... *[insert full name]*

ITT No. and title:..... *[insert ITT number and title]*

Page..... *[insert page number]* of*[insert total number]* pages

Non-Performed Contracts in accordance with Section III, Qualification Criteria and Requirements			
<input type="checkbox"/> Contract non-performance did not occur since 1 st January <i>[insert year]</i> specified in Section III, Qualification Criteria and Requirements, Sub-Factor 2.1.			
<input type="checkbox"/> Contract(s) not performed since 1 st January <i>[insert year]</i> specified in Section III, Qualification Criteria and Requirements, requirement 2.1			
Year	Non-performed portion of contract	Contract Identification	Total Contract Amount (current value, currency, exchange rate and KENYA SHILLING equivalent)
<i>[insert year]</i>	<i>[insert amount and percentage]</i>	Contract Identification: <i>[indicate complete contract name/ number, and any other identification]</i> Name of Procuring Entity: <i>[insert full name]</i> Address of Procuring Entity: <i>[insert street/city/country]</i> Reason(s) for nonperformance: <i>[indicate main reason(s)]</i>	<i>[insert amount]</i>
Pending Litigation, in accordance with Section III, Qualification Criteria and Requirements			
<input type="checkbox"/> No Litigation History in accordance with Section III, Qualification Criteria and Requirements, Sub-Factor 2.4.			
<input type="checkbox"/> Litigation History in accordance with Section III, Qualification Criteria and Requirements, Sub-Factor 2.4 as indicated below.			
Year of award	Outcome as percentage of Net Worth	Contract Identification	Total Contract Amount (currency), USD Equivalent (exchange rate)
<i>[insert year]</i>	<i>[insert percentage]</i>	Contract Identification: <i>[indicate complete contract name, number, and any other identification]</i> Name of Procuring Entity: <i>[insert full name]</i> Address of Procuring Entity: <i>[insert street/city/country]</i> Matter in dispute: <i>[indicate main issues in dispute]</i> Party who initiated the dispute: <i>[indicate "Procuring Entity" or "Contractor"]</i> Reason(s) for Litigation and award decision <i>[indicate main reason(s)]</i>	<i>[insert amount]</i>

4. Form FIN – 3.1 - Financial Situation and Performance

Financial Situation and Performance

[The following table shall be filled in for the Applicant and for each member of a Joint Venture]

Applicant's Name: *[insert full name]*

Date: *[insert day, month, year]*

Joint Venture Member Name: *[insert full name]*

ITT No. and title: *[insert ITT number and title]*

Page..... *[insert page number]* of *[insert total number]* pages

1. Financial data

Type of Financial information in (currency)	Historic information for previous_ <i>[insert number]</i> years, <i>[insert in words]</i> (amount in currency, currency, exchange rate*, USD equivalent)				
	Year 1	Year 2	Year 3	Year4	Year 5
Statement of Financial Position (Information from Balance Sheet)					
Total Assets (TA)					
Total Liabilities (TL)					
Total Equity/Net Worth (NW)					
Current Assets (CA)					
Current Liabilities (CL)					
Working Capital (WC)					
Information from Income Statement					
Total Revenue (TR)					
Profits Before Taxes (PBT)					
CashFlow Information					
Cash Flow from Operating Activities					

* Refer ITA 14 for the exchange rate

5.2 Sources of Finance

[The following table shall be filled in for the Applicant and all parties combined in case of a Joint Venture]

Specify sources of finance to meet the cash flow requirements on works currently in progress and for future contract commitments.

No.	Source of finance	Amount (Kenya shilling equivalent)
1		
2		
3		

5.3 Financial documents

The Applicant and its parties shall provide copies of financial statements for *[number]* years pursuant Section III, Qualifications Criteria and Requirements, Sub-factor 3.1. The financial statements shall:

- a) reflect the financial situation of the Applicant or in case of JV member, and not an affiliated entity (such as parent company or group member).
- b) Be independently audited or certified in accordance with local legislation.
- c) Be complete, including all notes to the financial statements.
- d) Correspond to accounting periods already completed and audited.

☐ Attached are copies of financial statements¹ for the *[number]* years required above; and complying with the requirements

6 Form FIN - 3.2 - Average Annual Construction or Supply Contracts Turnover

[The following table shall be filled in for the Applicant and for each member of a Joint Venture] Applicant's

Name: *[insert full name]*

Date: *[insert day, month, year]*

Joint Venture Member Name: *[insert full name]*

ITT No. and title: *[insert ITT number and title]*

Page.....*[insert page number]* of*[insert total number]* pages Table A (Complete if Contractor)

Annual turnover data (construction only)			
Year	Amount Currency	Exchange rate*	USD equivalent
<i>[indicate calendar year]</i>	<i>[insert amount and indicate currency]</i>		
		Average Annual Construction Turnover **	

* Refer ITA 14 for date and source of exchange rate.

** Total Kenya shilling equivalent for all years divided by the total number of years. See Section III, Qualification Criteria and Requirements, 3.2.

Table B (Complete if Supplier)

Annual turnover data (Supply contracts)			
Year	Amount Currency	Exchange rate*	USD equivalent
<i>[indicate calendar year]</i>	<i>[insert amount and indicate currency]</i>		
		Average Annual Construction Turnover **	

Refer ITA 15 for date and source of exchange rate.

** Total Kenya shilling equivalent for all years divided by the total number of years. See Section III, Qualification Criteria and Requirements, 3.2.

PART 2 - GOODS/SERVICES REQUIREMENTS

**SECTION V - SYSTEM REQUIREMENTS AND
TECHNICAL SPECIFICATIONS DOCUMENT FOR THE
SUPPLY, DELIVERY, CONFIGURATION, TESTING
AND COMMISSIONING OF AN UNMANNED AIRCRAFT
SYSTEMS TRAFFIC MANAGEMENT SYSTEM (UTM)**

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ABBREVIATIONS

AAID	Air Accidents Investigation Division
ACAS	Airborne Collision Avoidance System
AIP	Aeronautical Information Publication
ANSP	Air Navigation Service Provider
ATC	Air Traffic Control
ATM	Air Traffic Management
ATS	Air Traffic Service
ATSU	Air Traffic Service Unit
BVLOS	Beyond Visual Line of Sight
CRM	Crew Resource Management
DA	Danger Area
DSA	Daily Subsistence Allowance
FRTOL	Flight Radio Telephony Operators' Licence
GCS	Ground Control Station
HALE	High Altitude Long Endurance
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
KCAA	Kenya Civil Aviation Authority
MoD	Ministry of Defence
MOR	Mandatory Occurrence Reporting
MTOM	Maximum Take-off Mass
RA (T)	Restricted Area (Temporary)
ROMS	RPAS Operations Management System
RPA	Remotely Piloted Aircraft
RPAS	Remotely Piloted Aircraft System
RPASc	Remotely Piloted Air System Commander
RPS	Remote Pilot Station
RTF	Radiotelephony
RTS	Release to Service
SARPs	Standards and Recommended Practices
SRG	Safety Regulation Group
SSR	Secondary Surveillance Radar
TCAS	Traffic Collision Avoidance System
TDA	Temporary Danger Area
VFR	Visual Flight Rules
VLOS	Visual Line of Sight

1. Introduction

1.1 Purpose

The project for Supply, Delivery, Configuration, Testing and Commissioning of an Unmanned Aircraft Systems Traffic Management System (UTM) for Kenya Civil Aviation Authority. The UTM system is aimed at enhancing aviation safety and security in the advent of Unmanned Aircraft Systems (UAS) Operations.

Following the promulgation and implementation of the Civil Aviation (Unmanned Aircraft Systems) Regulations 2020 and the increased interest in UAS operations of various types and for various purposes a UTM is necessary to enhance aviation safety and security while facilitating the integration of UAS operations in the airspace shared with conventional air traffic.

1.2 UTM Description

The UTM is meant for uncontrolled UAS operations that is separate from, but complementary to, the conventional Air Traffic Management (ATM) system. The UTM is expected to ultimately identify services, roles and responsibilities, information architecture, data exchange protocols, software functions, infrastructure, and performance requirements for enabling the management of low-altitude uncontrolled drone operations.

The UTM is expected to enable monitoring of multiple drone operations conducted within Visual Line-of-Sight (VLOS), Extended Visual Line-of-Sight (EVLOS) and Beyond Visual Line-of-Sight (BVLOS), where air traffic services are either provided or not. The UTM will be expected to be a complementary system and thus facilitate the identification of UAS operations in given areas and facilitate ATM to take necessary action to preserve safety of air navigation.

UTM systems are therefore envisaged to be interoperable and consistent with existing ATM systems in order to facilitate safe and efficient operations.

1.3 Project Scope

The UTM should be capable of performing the required tasks as well as be interoperable with existing systems in KCAA such as the ATS systems as well as the Remotely Piloted Aircraft Systems (RPAS) Oversight Management System (ROMS), ARMS, ATM, CRONOS, AMSS and the proposed ASSR system. The core UTM Operations Command Centre infrastructure, ICT infrastructure, end-user devices and extensive training shall also be provided within the scope of the project.

1.4 References

The UAS Implementation taskforce provided most of the information contained in this document. Reference was also made to the Civil Aviation Act, the UAS regulations and the UAS Manual of Implementing standards.

2. UTM REQUIREMENTS AND SPECIFICATIONS

2.1 Summary of Core UTM Modules

Summary of Requirements and Specifications for the UTM

No.	Item/Specification	Details	Requirement	Phase
1.	User Management	Login details for the UTM to be linked with ROMS. The existing ROMS credentials to be utilized to login to the UTM.	M	1
2.	Configuration & Customization Panel	For Customization and management of settings data. These configurations entail the following: - v. Devices vi. Organizations vii. Individuals viii. Counties ix. Sub-counties x. UAS and Operator Registries – via integration with ROMS	M	1
3.	Authorization Approvals	All authorization approvals shall originate from the ROMS. The UTM System should be fully integrated with the KCAA ROMS.	M	1
4.	Flight Requests	All Flight Requests shall originate from ROMS. This shall be activated 30 minutes to 24 hours before the flight based on previously approved Authorizations.	M	1
5.	Geo Engine & Airspace Management	i. AIM/AIP Integration. ii. Geo-Layer Engine with rules definition & Validation capability. iii. Airspace definitions and restrictions management. iv. Maps management indication zoned airspaces with no-fly zones, restricted fly-zones and limited-fly zones. v. Adhoc airspace restriction and whitelisting of specific devices. vi. Geo-fencing. Creation of geo-fences within which UASs operations are prohibited.	M	1
6.	Non-Cooperative Engine	i. Simplified API integration with Non-Cooperative Detection System (RF & Radar).	M	1
7.	Flight Management	i. Flight Management. This shall include planned flights, active flights, operated flights, canceled flights amongst others.	M	1
8.	Real-Time Traffic Monitoring and Surveillance	i. Total situational awareness and management with ATM-UTM Consolidated Traffic Monitoring. ii. Graphic representation of currently available traffic customizable to the User. iii. Playback of recorded footage	M	1
9.	Recording of Traffic Movement	i. Recording and keeping footage of traffic movement. ii. This should be kept in its own server in a virtualized environment. iii. This footage should be kept for at least six (6) months. iv. Selection of footage should have multiple parameters with play forward and play backs.	M	1
10.	Transponders	i. Retro-fitted to UASs to transmit key flight telemetry independent of the platform.	M	1

		<ul style="list-style-type: none"> ii. Transponder specifications. <ul style="list-style-type: none"> a. Technology – GSM (2G/3G/4G/4G+/5G ready), GPS and/or ADS-B. iii. Reported parameters; Device ID, registration number, altitude, air speed, ground speed, LIVE location (GPS), flight time, departure, destination (at end of flight), flight path, pilot location (Coordinates (DDMMSS) – WGS84 Format). 		
11.	Deconfliction Module/Detect and avoid	<ul style="list-style-type: none"> i. Deconfliction Engine with configurable priority and Traffic Alert System. ii. This required between UASs. iii. This is also required between UASs and other obstacles e.g., buildings. iv. Strategic deconfliction. 	M	1
12.	Robust Risk Management	<ul style="list-style-type: none"> i. Risk profiling for Authorization and Flight Request Approvals. ii. Structured automatic approvals for low-risk operations. iii. The risk assessment should be based on Specific Operations Risk Assessment Module as per JARUS SORA guidelines as an interfaced module integrated with Operator and Authority UTM workflows. 	M	1
13.	Communications & Alerts Module	<ul style="list-style-type: none"> i. SMS & App Notifications and Alerts & Real-Time Communication with Operators. ii. The UTM System shall be able to integrate with social media platforms e.g. WhatsApp, Twitter and Instagram where necessary. iii. Email notifications – this shall require integration with the KCAA Office 365 Email System. iv. Types of alerts – STCA, AIW, CLAM, RAM. 	M	1
14.	Digital Surface Modelling	Obstacles & Terrain Data Overlay for Flight Planning & Real-Time Alert Management.	M	1
15.	Emergencies	Emergency Management.	M	1
16.	Digital Logbook	Digital Logbook.	M	2
17.	Reporting and Analytics	Web-based HTML5 dynamic dashboards.	M	1
18.	Immediate Integrations with Other Systems	<ul style="list-style-type: none"> i. ROMS 	M	1
19.	Future Integrations with Other Systems	<ul style="list-style-type: none"> i. Maestro ATM ii. Top Sky iii. IBROS iv. ROMS v. ARMS vi. CRONOS vii. ERP viii. Proposed ASSR Automation ix. AMSS x. Counter-UAS Systems (C-UAS) xi. The KCAA Active Directory 	M	2
20.	Communication Interfaces	<ul style="list-style-type: none"> i. Core UTM to Devices/UASs ii. Core UTM to Ground Stations/Pilots iii. Core UTM to ATMS and other Systems iv. Notifications (GSM, Email, Firebase) 		

		v. UTM Control Centre		
21.	Core ICT Infrastructure	i. Data Possessors ii. UTM Servers iii. Virtualization iv. Relational DBs v. Replication vi. Disaster Recovery vii. Backups viii. Load balancers for the Core Services	M	1
22.	UTM Operations Command Centre	i. All design elements of the Operations Command Centre ii. Furniture <ul style="list-style-type: none"> a. Five desks b. Five chairs ix. Any other core infrastructure	M	1
23.	Operations Centre Hardware	i. System Units ii. Panels/Consoles iii. All-in-one PCs iv. Printers v. Input Devices vi. Networks vii. Furniture <ul style="list-style-type: none"> a. Five desks b. Five chairs c. Any other core infrastructure 	M	1
24.	Remote Operations Tracking	i. Access the central monitoring console via the internet. ii. Should be presented graphically over an interactive webpage. iii. Access to this interface should be protected SSL and firewalls.	M	1
25.	Cybersecurity	i. SSL Certificates ii. Firewalls iii. Reinforcing Cyber Resiliency	M	1
26.	End User Hardware	i. All-in-one computers ii. System Administrator Laptops iii. Laptops iv. Tablets v. Device Transponders vi. IP Telephone Sets	M	1
27.	Services	i. Project management ii. Quality assurance iii. Critical design review iv. Technical training v. End user training vi. ATCO training vii. KCAA staff sensitizations viii. Industry sensitization	M	1
28.	Output Data & Dashboards	i. Dashboards ii. Reports iii. Flight Movement Records iv. Live Charts v. Exceptional Events	M	1
29.	Licensing Framework	i. The core UTM licences should be perpetual ii. The user licencing should accommodate all Internal KCAA users and stakeholders as well as UAS Owners/Operators. To meet this requirement, the system should	M	1

		accommodate a minimum of one hundred (150) concurrent users.		
30.	Interoperability	i. With UAS tracking chipsets ii. Jamming systems iii. Counter-UAS systems	M	2
31.	Scalability, maintenance and support	i. Scalability ii. OEM Support iii. SLA	M	1/2
32.	Flight Planning and Billing	Flight Planning and ANS Billing for BVLOS Operations	M	2

2.2 Detailed of UTM System Requirements and Specifications

2.2.1 User Management

2.2.1.1 User Logins

Login details for the UTM to be linked with ROMS. The existing ROMS credentials to be utilized to login to the UTM. AD integration shall also be required to authenticate internal KCAA users.

2.2.1.2 User Profiles

i. Systems Admin

The systems admin will have access to all parts of the System.

The Systems Administrator should be able to modify User Profiles and Roles.

ii. UAS Officer

The UAS officer will have the following responsibilities: -

- Viewing Authorization Approvals from ROMS.
- Viewing CoRs information.
- Making changes to flight requests approvals.
- Approving flight requests.
- Maps Management.
- Risk profiling for Authorization.
- Monitoring flights within Geofenced and restricted airspaces.
- Coordination with relevant agencies for UAS operations.
- Reviewing UAS Special Flight Requests e.g., in restricted zones.
- Evaluating and processing UAS Pilot and other crew Information.
- Listing and viewing reports within all modules in the system.
- Create Geo-fences and Airspace Restrictions.
- View total flight hours from the digital logbook.
- Passive and/or active interception.

iii. UAS Manager

The UAS Manager will have the following responsibilities: -

- Viewing Authorization Approvals from ROMS.
- Viewing CoRs information.
- Making changes to flight requests approvals.
- Approving flight requests.
- Maps Management.
- Risk profiling for Authorization.
- Monitoring flights within Geofenced and restricted airspaces.
- Coordination with relevant agencies for UAS operations.
- Reviewing UAS Special Flight Requests e.g. in restricted zones.
- Approving UAS Special Flight Requests e.g. in restricted zones.
- Evaluating and processing UAS Pilot and other crew Information.
- Listing and viewing reports within all modules in the system.
- Create Geo-fences and Airspace Restrictions.
- Approve Geo-fences and Airspace Restrictions.
- Approvals in danger/restricted areas where appropriate.
- Airspace definition and restriction Management.

- Maps management indication zoned airspaces with no-fly zones, restricted fly-zones and limited-fly zones.
- Adhoc airspace restriction and whitelisting of specific devices.
- Listing and viewing reports within all modules in the system.
- View total flight hours from the digital logbook.
- Passive and/or active interception.
- Access recording.

iv. UAS Operator

The UAS Operator will have the following responsibilities: -

- View CoRs information of own UAS fleet.
- View own authorizations from ROMS.
- Fill, edit/modify and submit flight requests.
- View the progress/status of the submitted flight requests.
- Listing and viewing own documents and reports within all modules in the system.
- Track their previous and real-time UAS flights.

v. UAS Owner

The UAS Owner will have the following responsibilities: -

- View CoRs information of own UAS fleet.
- View own authorizations from ROMS.
- Fill, edit/modify and submit flight requests.
- View the progress/status of the submitted flight requests.
- Listing and viewing own documents and reports within all modules in the system.
- Track their previous and real-time UAS flights.

vi. UAS Pilot

The UAS Pilot will have the following responsibilities: -

- Application for UAS Flight requests.
- Conducting the flight as per the approval.
- Reporting any incident or accident concerning UAS operation.
- Checking weather information relevant to UAS.
- Track their own previous and real-time UAS flights.
- View their own total flight hours from the digital logbook.

vii. Ministry of Defence (MoD)

The MoD will have the following responsibilities: -

- Listing and viewing all documents and reports within all modules in the system.
- Making changes to Special Flight Requests.
- Viewing Maps.
- Viewing Risk profiling for Authorization.
- Monitoring flights within Geofenced and restricted airspaces.
- Coordination with relevant agencies for UAS operations.
- Listing and viewing reports within all modules in the system.
- Create Geo-fences and Airspace Restrictions.
- View Geo fenced areas.
- View Airspace definitions and restrictions.
- View total flight hours from the digital logbook.
- Passive and/or active interception.

viii. UAS ATC/AIS

Viewing Authorization Approvals from ROMS.

- List and view approved Operating Authorizations.
- List and view CoRs information.
- List and view flight requests.
- View Maps and Airspace definitions.
- List and view UAS Pilots details for Active Flight Requests.
- Approve Flight Requests within controlled Airspace.

ix. UAS Security Stakeholders

The UAS profile will provide UAS information and approvals without any transactions. These institutions include NIS, NPS etc. They should have the following responsibilities: -

- Listing and viewing UAS Authorization approvals.
- Listing and viewing UAS Flights.
- Track their previous and real-time UAS flights.
- Passive and/or active interception.
- Investigation of UAS incidents/accidents related to crime/terror.

2.2.1.3 Creation of New Users

This shall be undertaken using the ROMS.

2.2.2 Configuration & Customization Panel

For Customization and management of settings data. These configurations entail the following: -

i. UAS Types

The UAS Types Management will offers the following data: -

UAS Specifications

- a. Make
- b. Model
- c. Aircraft Type – DDL {Rotorcraft, Fixed Wing, Others}
- d. MTOM(KGs)
- e. Wingspan/Rotor Diameter (M)
- f. Length (M)
- g. Height (M)
- h. Propulsion Type – DDL {Jet, Propeller, Combustion, Electric, Others}
- i. Engine Type – DDL
- j. Engine No.
- k. Displacement(cm³)
- l. Power (W)
- m. Thrust (N)
- n. Propulsion Accumulator – DDL {Yes, No}: -
 - i. Type
 - ii. Capacity (Ah)
 - iii. Number of cells (pcs)
- o. Propeller – DDL {Yes, No}: -
 - i. Manufacturer
 - ii. Diameter(mm)
- p. Payload Weight (KGs)

Estimated UAS Performance

- q. Max. Endurance (min)

- r. Max. Speed (Km/h)
- s. Required distances: -
 - i. Takeoff(m)
 - ii. Landing(m)
 - iii. Max. Range (Km)
 - iv. Max. Altitude (ft)

Remote Control

- t. Remote Control: -
 - i. Transmitter/Receiver (s) Manufacturer
 - ii. Transmitter/Receiver(s) Type
 - iii. Frequency Band (MHz)

Telemetry

- u. Telemetry: -
 - i. Manufacturer
 - ii. Frequency Band (MHz)
 - iii. Scanned Parameters

Operations

- v. Detect and Avoid Capabilities

These UAS Types are already available in the ROMS. All the data as indicated above should also be maintained in the UTM System.

ii. UASs

These are the already registered UAS and issued with Certificates of Registration in the format 5Y-0001A. The UTM System shall be obtaining this data from the ROMS.

iii. UAS Entities

The ROMS has entities who are either Organizations or Individuals. These entities have facets of data that shall be maintained in the UTM as well. The required data is as follows: -

- User Type – DDL (Individual, Others)
- Employment No.
- Stakeholder Organization – DDL (KRA Customs, MoD)
- Name
- ID No. – Applicable for Individuals
- Passport No. – Applicable for Individuals
- Gender – Applicable for Individuals
- Date of Birth/Organization Registration Date
- Email
- Postal Address
- Postal Code
- Town/City
- Telephone No.
- Mobile No.
- Physical Address
- County – DDL
- Country – DDL

iv. ROCs

These are the authorized RPAS Operator Certificates. This data is maintained in the ROMS.

v. Pilots

These is the data of various Remote Pilots. This data shall be maintained in the ROMS.

vi. Counties

This is the data of counties in Kenya used for location UAS operation areas. This data is maintained in the ROMS. Within each county are sub-counties.

vii. Aerodromes

This data shall be the list of all Aerodromes. The following data should be maintained accurately: -

- Aerodrome Name
- ICAO Location Indicator
- Aerodrome Reference Point Coordinates in the format (DDMMSS) – WGS84 Format
- Aerodrome Code

viii. Default Formats

- a. Date formats – All dates in the system should be in the format **dd-Mon-yyyy**.
- b. Time formats – All time formats in the system should be 24 hours in UTC in the format **HHMM**. In some instances, the time in seconds shall be required in the format **HHMMSS**.
- c.

2.2.3 Geo Engine & Airspace Management

- i. AIM/AIP Integration: the system should be able to integrate with AIM/AIP maps and provide a service that is capable of satisfying users' operational requirements.
- ii. Geo-Layer Engine with rules definition and validation capability. The system should be able to access different types of maps/charts used in aviation and give restriction at different heights AGL within HKNA FIR including but not limited to: -
 - a. National Parks, National Reserves and Game Reserves.
 - b. Prohibited, restricted danger and temporary restricted areas.
 - c. Nairobi FIR, TMAs, CTAs and Control zones.
 - d. Terrain and obstacle data.
- iii. The system should define different airspaces based on areas as well as flight levels. It should also undertake maps management indicating zoned airspaces with no-fly zones, restricted fly-zones and limited-fly zones.
- iv. The system should be able to create adhoc airspace restrictions.
- v. Whitelisting.
Within a restricted zone/area/airspace, a UASs can be whitelisted and therefore permitted operate within these sections.
- vi. Geo-fencing. Creation of geo-fences within which UAS operations are prohibited including: -
 - a. Emergency scenes, public event
 - b. There should be the capability to permit accredited authorities to create temporary restricted areas on short notice, for example, to protect an area of public safety concern. In such situations, a system for transmitting these restrictions to UAA already in flight will be needed.
 - c. Within ten (10) kilometres of an aerodrome from the aerodrome reference point for code C, D, E and F aerodromes.
 - d. Within seven (7) kilometres of an aerodrome from the aerodrome reference point for code A and B aerodromes.
 - e. On approach and take-off paths.
 - f. Within the vicinity of navigation aids.
 - g. Within the aerodrome traffic zone.
 - h. Within terminal traffic holding patterns.
- vii. Obstacles and Terrain Data overlay for Flight Management: list of area 1 obstacles including type of obstacle, coordinates, height AGL in metre or feet, lights or colour.

2.2.4 Transponders

2.2.4.1 General Transponder Requirements

Retro-fitted to UASs to transmit key flight telemetry independent of the platform. The transponder device should provide surveillance and drone operator identification capability independent of the platform.

2.2.4.2 Transponder Specifications.

The Transponder must have the following key specifications

- i. Technology – GSM (2G/3G/4G/4G+/5G ready), GPS and/or ADS-B.
- ii. Modes 3/A, C, S for CAT C operations.
- iii. ADS-B Out (extended squitter) to performance standard RTCA DO-260B.
- iv. Integrated GPS.
- v. Plug and play with most autopilots.
- vi. Small size and weight.
- vii. Low power: < 1W standby, 8 watts (typical), 14 watts (max).
- viii. Intuitive command and control software included.
- ix. Five 9s Reliability levels.
- x. Multiple communication ports.
- xi. Autopilot integration.
- xii. Multi-mode capabilities.
- xiii. Tamper proof.
- xiv. Self-powered.

2.2.4.3 Reported Parameters

Device ID, registration number, altitude, air speed, ground speed, LIVE location (Coordinates (DDMMSS) – WGS84 Format), flight time (UTC), departure, destination (at end of flight), flight path, pilot location (Coordinates (DDMMSS) – WGS84 Format).

2.2.5 Authorization Approvals

Approvals for authorizations shall be undertaken in the ROMS. All approval information to be provided to the UTM on approval at ROMS.

- i. The following information should be availed: -
 - a. Category of Operation
 - b. Departure County – DDL
 - c. Departure Sub-County - DDL
 - d. Departure Area Name
 - e. Departure Coordinates (DDMMSS) – WGS84 Format
 - f. Start Date
 - g. Destination County – DDL
 - h. Destination Sub-County - DDL
 - i. Destination Area Name
 - j. Destination Coordinates (DDMMSS) – WGS84 Format
 - k. End Date
 - l. Description of the Operation
 - m. No. of Days – System calculated
 - n. No. of Drones to be Utilized
 - o. Remote Pilots' Name(s) and Licence Details
 - p. Pilot's location - Coordinates (DDMMSS) – WGS84 Format
 - q. Remarks
- ii. It is upon the vendor of the UTM to provide APIs, connectivity or any other technology that shall ensure this information is transmitted seamlessly from the ROMS to the UTM.

Where whitelisting is necessary, it should be undertaken when the Flight Request is approved.

2.2.6 Flight Requests – Done by UAS Pilot

- i. Prerequisites –
 - a. Prior Authorization from ROMS.
 - b. 24 Hours before the flight, the UTM shall activate it to enable the Pilot make the flight request. This shall be based on prior authorization data.
 - c. Timings - the flight request shall be submitted between 30 minutes and 24 hours prior to flight
 - d. Information from authorizations should be as follows: -
 - i. Category of Operation
 - ii. Departure County – DDL
 - iii. Departure Sub-County - DDL
 - iv. Departure Area Name
 - v. Departure Coordinates (DDMMSS) – WGS84 Format
 - vi. Start Date
 - vii. Destination County – DDL
 - viii. Destination Sub-County - DDL
 - ix. Destination Area Name
 - x. Destination Coordinates (DDMMSS) – WGS84 Format
 - xi. End Date
 - xii. Description of the Operation
 - xiii. AGL
 - xiv. No. of Days – System calculated
 - xv. No. of Drones to be Utilized
 - xvi. Remote Pilots' Name(s) and Licence Details
 - xvii. Pilot's location - Coordinates (DDMMSS) – WGS84 Format
 - xviii. Remarks
 - e. The Pilot MUST Inform the nearest Government Security Agency
- ii. Modifiable Values from the Authorizations and to what extent
 - a. Date(s) of Operation (reschedule)
 - b. Time(s) of Operation (reschedule)
 - c. Pilots (add, remove)
- iii. Approvals
 - a. Automatic approvals for low-risk operations based on the following: -
 - i. No changes in the authorization granted on ROMS.
 - ii. There's no need for ATS involvement based on the Area or Altitude.
 - iii. The Operation is not near an Aerodrome.
 - b. Approvals/Recommendations by UAS Officer/UAS Manager
 - i. If the changes involve increase in altitude
 - ii. Changes in areas of operation
 - iii. Changes in UASs
 - iv. Change of Pilots.
 - c. Approvals by ANS
 - i. Operations within 10km of aerodromes
 - ii. Operations in controlled airspace
- iv. The User (Pilot/ Operator) is able to view the following data regarding their own operations: -
 - a. Approved flights
 - b. LIVE flights
 - c. Pending flights – Operating authorization has been granted
 - d. Recorded flights
- v. Special Flight Requests

- a. Whitelisting shall be undertaken the moment the flight request is approved. This is to allow specific UASs to operate within a restricted area based on the prior approval.

2.2.7 Robust Risk Management

- i. Risk profiling for Authorization and Flight Request Approvals.
The UTM should be capability for incorporating risk management criteria in the determination of flight requests for approval. The UTM should be able to facilitate the approval, alteration or termination of an operation based on predetermined risk profiles.
- ii. Structured automatic approvals for low-risk operations.
The UTM should be able to automatically facilitate the execution of flights determined to have low-risk operations. The determination of risk criteria to be based on the nature of operations, area of operations, duration of operations, proximity to restricted airspaces and installing. Where operations meet all criteria for low-risk operations, the UTM should automatically facilitate approval of such operations.
- iii. The risk assessment should be based on Specific Operations Risk Assessment criteria established by the Authority and considering establish risk models and assign a risk profile to each operation. The UTM should facilitate incorporation of risk mitigation measures to minimize any identified risks in the operation of a UAS and further revise the risk profiles.
The risk assessment module should be integrated with Operator and Authority UTM workflows.

2.2.8 Flight Management – For Internal Users

Allow viewing flights as a listing and also opening and viewing all the details for each flight. There should also be a graphical flight track where applicable. The listing should allow search based on a single item in the flight or a combination of many items. The default views within this module should be grouped as below: -

- i. Approved flights.
- ii. LIVE flights.
- iii. Pending flights – Operating authorization has been granted.

2.2.9 Real-Time Traffic Monitoring and Surveillance – For Internal Users

- i. Total situational awareness and management with UTM Traffic Monitoring.
The UTM should be capable of real time and accurate display of all active UAS flights which includes regular update of position and altitude of the UAS.
- ii. Total situational awareness and management with UTM-ATM Consolidated Traffic Monitoring.
The UTM system should be able to display UAS operations and manned aviation operations simultaneously based on user need.
- iii. Graphic representation of currently available traffic customizable to the User.
The system should be able to display information that the user requires at any time for an active flight. This includes Registration, altitude, position, track.

2.2.10 Deconfliction Module/Detect and Avoid

- i. Deconfliction Engine with configurable priority and Traffic Alert System.
- ii. This required between UASs.
- iii. This is also required between UASs, manned aircrafts and other obstacles e.g., buildings.
- iv. Strategic deconfliction signal analysis and processing.
- v. Collision risk assessment and mitigation measures (Detection/ self-separation/ avoidance approach).

2.2.11 Communications & Alerts Module

- i. SMS & App Notifications and Alerts & Real-Time Communication with Operators
 - a. Integration with KCAA SMS gateway through APIs
 - b. Provide in-app push notifications through Google Firebase APIs to users using the UTM app on iOS and Android
- ii. Email notifications – this shall require integration with the KCAA Office 365 Email System.
- iii. Types of alerts
 - a. Short Term Conflict Alert
This is to be indicated in red color whenever two or more UAS are detected to be in such proximity that there is danger of collision.
 - b. Airspace Infringement Warning
To be indicated in a conspicuous (preferred red) color whenever the UAS is observed to be within the confines of a controlled airspace, danger, prohibited or restricted area. The indication should include alerts for ad Hoc and/or temporary restrictions.
 - c. Cleared Level Adherence Monitoring
To be indicated in red color whenever the UAS is detected to be at an altitude that is above the altitude approved on the flight approval
 - d. Route Adherence Monitoring
To be indicated in red color whenever the UAS is detected to be flying on a track that is different from the one in the flight approval or outside established flying tracks or access lanes.
- iv. UAS/UTMS Operations Centre Communications
 - a. ATC UTM Operations Center
Should have an operation center capable of reliable and instant point to point connection between the UTM center and ATC units (ACC, APP and TWR). The communication center should be capable of mobile and land line connection.
- v. UTM Broadcast Messages
 - a. To all UTM stakeholders or a Sub-set of Stakeholders.

2.2.12 Legal Recording and Playback of Recorded Traffic

- i. Legal Recording
 - a. The aim of the legal recording service is to support accident and incident investigation. The service should record all inputs to U-space and allow the full state of the system at any moment to be determined. A second use of legal recording is as a source of information for research and training. Finally, post-processing of legal recording data by dedicated (e.g. AI-based) algorithms can identify high risk situations and adapt parameters for risk assessment of future operations.
 - b. Access to the recordings will be restricted.
- ii. Playback of Recorded Traffic
 - a. Recording of Traffic Movement.
 - b. Recording and keeping footage of traffic movement.
 - c. This should be kept in its own server in a virtualized environment.
 - d. This footage should be kept for at least six (6) months.
 - e. Selection of footage should have multiple parameters with play forward and play backs.
 - f. The recording should have restricted access to support accident and incident investigation.

2.2.13 Non-Cooperative Engine

Simplified API integration with Non-Cooperative Detection System (RF & Radar).

- i. Immediate Detection, alert and Identification of all unauthorized and non-cooperative drones. by layering RF, radar and EO sensors.
- ii. Realtime Tracking drone movements and hostile pilot location.
- iii. Passive and/or active Interception.

2.2.14 Emergencies

Provides assistance to a drone pilot experiencing an emergency with their drone, and communicates emerging information to interested parties.

2.2.15 Digital Logbook

Digital The digital logbook service extracts information from the legal recordings to produce reports relevant for whoever is using the service. It shall give users access to their own information only. Drone operators and pilots will be able to see summaries of information for flights they have been involved in; start and end times, places, aircraft id, and so on.

Drone pilots will be able to see histories of and statistics about their flight experience. The digital logbook service needs to be securely implemented. Various query functions should be available.

Authorized users, such as accident investigators or police may have general access to all data.

2.2.16 Reporting and Analytics

- i. Web-based HTML5 dynamic dashboards.
- ii. Dashboards
- iii. Reports
 - a. Flight requests
 - b. Special flight requests
 - c. Unapproved operations
 - d. Rejected flight requests
 - e. Flight Movement Records
 - f. Cancelled operations
 - g. Delayed/altered flight requests
 - h. Emergencies reported
 - i. Approval timelines – OTP
- iv. Statistics: The system shall be able to automatically generate statistical data required to support ICAO KPI GANP. (Number of aircraft handle per sector, amount of delay per sector based on set KCAA performance target, number of delays per sector, number of TCAS-RA in each sector etc.)
- v. Incident/Accident reports
- vi. Emergencies
- vii. Live Charts
- viii. Exceptional Events
 - a. Near collisions/near misses.
 - b. Loss of communication/surveillance.
- ix. Weather

2.2.17 Immediate Integrations with Other Systems

- i. ROMS

The UTM system should provide seamless integration with the ROMS either by direct database inserts/selects/updates or through REST APIs. For the case of APIs, they should implement open identification and authorization mechanisms e.g., OAuth, SAML, etc. It is expected that proper

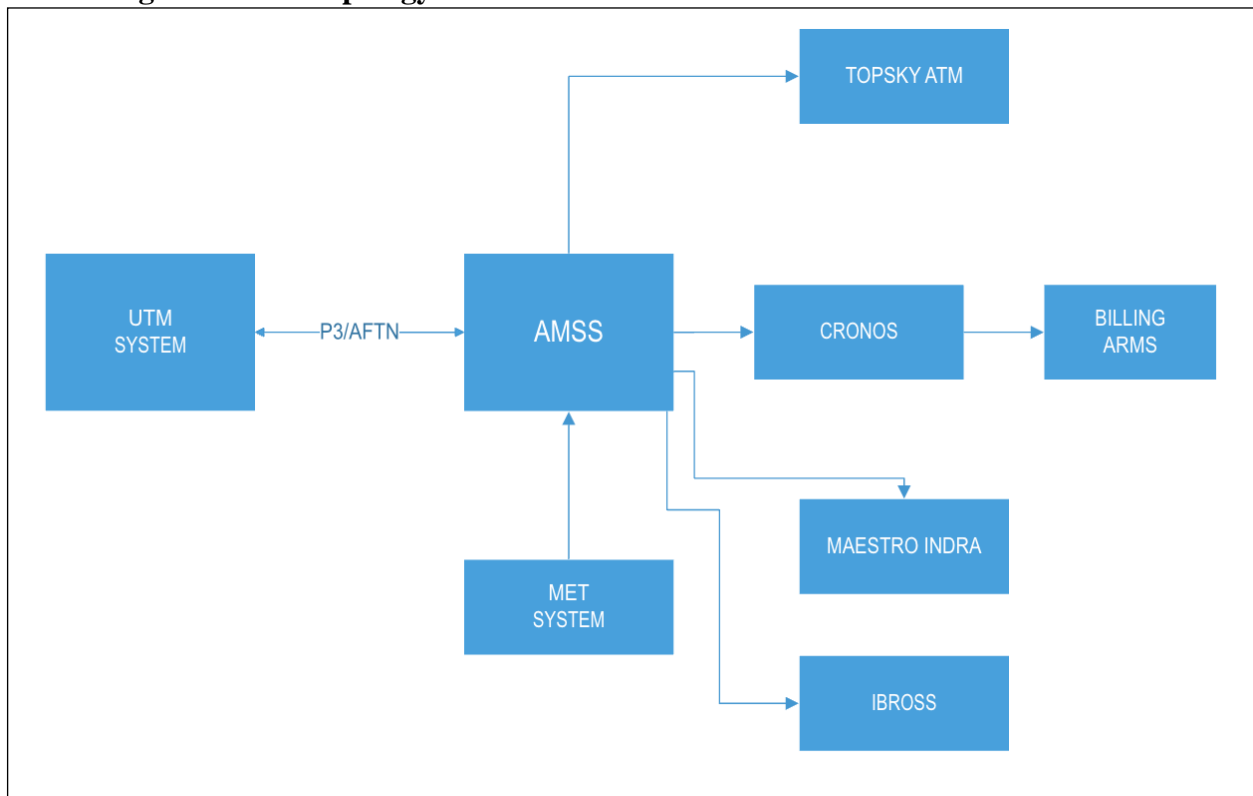
documentation of exposed APIs shall be provided. Additionally, the system administrators shall be trained on creating, testing and publishing APIs to be consumed by external endpoints on-demand.

The ROMS is inhouse built by KCAA using the .NET Framework and SQL Server Database.

2.2.18 Future Integrations with Other Systems

- i. Maestro ATM, Top Sky, IBROS, CRONOS, AMSS, Weather and ARMS

Block Diagram of the Topology



UTM → AMSS

The AMSS - Aeronautical Message Switching System is used to switch aeronautical messages. The UTM system should be able to handle AMHS and AFTN data formats.

MET → UTM

MET data sent to UTM through the AMSS.

UTM → CRONOS → ARMS BILLING

The Cronos System is an AIM system used for flight planning.

Flight plan sent to Cronos through the AMSS for onward forwarding to billing at ARMS.

UTM → TOPSKY ATM

Topsky ATM system is an ATS system used for aircraft surveillance.

Flight plans from UTM sent to Topsky ATM.

UTM → IBROSS

Ibross system is an ATS system used for aircraft surveillance.

Flight plans from UTM sent to Ibross

UTM → MAESTRO INDRA

Maestro Indra system is used for aircraft surveillance.

Flight plans from UTM sent to Maestro Indra.

ii. Proposed ASSR Automation

The UTM system should provide seamless integration with ASSR Systems, databases, and devices through REST APIs. The APIs should implement open identification and authorization mechanisms e.g., OAuth, SAML, etc. It is expected that proper documentation of exposed APIs shall be provided. Additionally, the system administrators shall be trained on creating, testing and publishing APIs to be consumed by external endpoints on-demand.

iii. The KCAA Active Directory

Integration with the KCAA Active Directory to facilitate authentication of internal KCAA users.

2.2.19 Infrastructure for Communication Interfaces

The UTM should be able to facilitate information exchange in order to provide the right information to the right people and time, in order to comply with safety, security and privacy requirements.

- i. Core UTM to Devices/UASs
- ii. Core UTM to Ground Stations/Pilots
- iii. Core UTM to ATMS and other Systems
- iv. Device to Device

2.2.20 Core ICT Infrastructure

i. UTM Servers and Virtualization

Ordinarily, the UTM is usually supplied with several core servers that support the operations of the system. These servers support the following services; Web-based Portals, databases, ADS-B and other receivers' servers, tracking processors, ATM processors amongst other requirements. To support all these services, three (3) high-end physical servers are required. These servers shall have the following specifications which are all mandatory: -

No.	Servers		
	Item	Specifications Required	Score
1.	Product and Quantity	Three (3) DELL PowerEdge R750 Servers or equivalent with a 2U Rack Form Factor.	M
2.	Manufacturer's Authorization	Manufacturer's Authorization to be provided for DELL.	M
3.	CPU	Intel Xeon Gold 6334 3.6G, 8C/16T, 11.2GT/s, 18M Cache, Turbo, HT (165W) DDR4-3200	M
4.	No. of CPUs	Two (2) processors per server.	M
5.	Memory	i. 512GB. ii. 16 slots each slot with 32GB DDR4 DIMM.	M
6.	I/O Slots	7 PCIe slots.	M
7.	Storage	SSD Storage: At least 2 TB using 2.5-inch Flash Storage. SAS Storage: At least 8 TB using 2.5-inch SAS storage.	M
8.	Storage Drive Types	id – SSD and SAS	M
9.	Network interface	Mezzanine LOM socket providing choices of 1 GbE and 10 GbE networking. 8 additional PCIe slots.	M

10.	Power supply	220-240V Primary Power Supply, Hot Plug Power Supply, 220-240V Redundant Power Supply.	M
11.	Warranty and Support	<ul style="list-style-type: none"> i. 3-year customer replaceable unit and on-site limited warranty, next business day 8x5, service upgrades available ii. ProSupport Plus for critical systems. 	M
12.	LCD Bezel	LCD control panel.	M
13.	Embedded NIC	4 x 10 GB.	M
14.	Systems Management	iDRAC9 with Lifecycle Controller.	M
15.	Rack Support	<ul style="list-style-type: none"> i. ReadyRails™ II sliding rails for tool-less mounting in 4-post racks with square or unthreaded round holes or tooled mounting in 4-post threaded hole racks. ii. Cable Management Arm to be included. 	M
16.	USB and VGA Ports	USB: 2 front/2 back/2 internal, VGA: 1 front, 1 back.	M
17.	RAID Support	Internal controllers: S140, HBA 330, PERC H330P, PERC H730P, PERC H740P. External controllers (RAID): H840, 12 Gbps SAS HB	M
18.	HBAs	Two (2) Dell Recommended Emulex LPE 31002 Dual Port 16Gb Fibre Channel HBA, PCIe Full Height	M
19.	Optical and other Drives	DVD+/-R/RW and 2TB External Hard-drives.	M
20.	Virtualization	<ul style="list-style-type: none"> i. Each Server should be virtualization ready with two (2) processor license for VMware vSphere 7 Enterprise Plus ii. The licences should have VMware support durations for a minimum of three (3) years. iii. The VMware licenses should be registered under the KCAA VMware Portal. 	M
21.	Accessories	Provision of all accessories required for connectivity. These include but not limited to: - <ul style="list-style-type: none"> i. FC Cables – At least four (4). ii. 3 Metre LAN Cables (Panduit) with metallic RJ45 connectors - At least twenty (20). iii. Power Cables – Satisfactory to dual power the servers. iv. Cage Nuts and Mounting Screws – Satisfactory to mount the servers. 	M
22.	Miscellaneous	<ul style="list-style-type: none"> i. Mounting of the Servers into the racks and configuration of redundant network and power. Two servers shall be mounted in HQ while another server shall be mounted in the KCAA RDRS in Mombasa. ii. Installation of the VMware Hypervisor and activation of the Licenses. iii. The virtual servers should be added to the HQ vCenter Server. iv. The configuration should present no single-point-of failure. v. Testing all configurations, provision of a final report and relevant sign-offs. 	M
Total Marks			Mandatory

ii. Relational DBs

The databases should be relational. This means that they should be either MSSQL, PostgreSQL, MySQL or Oracle. Where applicable, enterprise licensing is expected for all the databases. The version installed should be the current version as at 2021.

iii. Replication

This shall require the provision of a single DELL EMC Virtual Recover Point Appliance (vRPA) License. This license allows fifteen (15) Virtual Machines (VMs). The VMs created in the KCAA HQ vCenter Server should be replicated to the KCAA RDRS vCenter Server to create shadow copies. Each replicated VM should have enough journal size to accommodate a two (2) week's protection window.

iv. Disaster Recovery

With the vRPA, replication and shadow copies set up as explained above, disaster recovery shall entail failovers to the shadow VMs in the RDRS. Once the problem in the main datacentre in KCAA HQ is resolved, the shadow copy in the RDRS shall be failed back to the HQ datacentre and replication continues by reestablishing the shadow copy.

v. Backups

The key VMs in the HQ datacentre cluster shall be backed up using the main KCAA backup and recovery software.

vi. Hosting

Public IP addresses, firewalls

2.2.21 UTMS Operations Command Centre Design

A UTM Operations Command Centre shall be established in KCAA headquarters with the following design elements.

- i. Partitioning of the Operations Command Centre and necessary interior designs. The bidder MUST provide detailed colour designs of the proposed UTMS Operations Command Centre.
- ii. Centralized network monitoring, multi-networked device configuration, preventative monitoring, and event reporting in order to minimize downtime and enable a faster response to mission-critical events.
- iii. Redundant and fallback systems for predictive maintenance. All electronic devices should have multiple network inputs and UPSs to support at least two (2) hours of power outage.
- iv. Full and instant access to remote computers and video sources to be able to work without computers present at the UTM control centres.
- v. Controlling multiple computers to help improve workspace ergonomics, reducing desktop clutter, noise, and heat.
- vi. Multi-user collaborative workflows, connecting multiple operators to multiple computers with real-time, pixel-perfect video performance.
- vii. Furniture
 - a. Five (5) desks
 - b. Five (5) chairs. The specifications for all required chairs are as follows: -

No.	Item	Specifications Required	Score
1.	Dymetrol Suspension	Dymetrol dissipates the occupant's weight over the entire chair surface improving blood flow and increasing oxygen levels to tissues. Improved blood flow and increased oxygen levels improves concentration and productivity and decreases fatigue. Dymetrol conforms to the shape of each occupant, as it almost instantly bounces back to original shape when weight is lifted.	M
2.	Safety Casters	Smooth dual wheel design with spring action not to roll away unless there is weight in chair. Dual connection point eliminates rattle for a smooth roll.	M
3.	All Steel Frame	Eleven gauge steel maintains original tensile strength and rigidity over years of 24/7 heavy duty use.	M

4.	4D Adjustable Armrests	No tools required to adjust. Swing arm style will swing up and down, pivot angular, forward-back, left-right	M
5.	Adjustable Seat Depth	Adjustment of the seat's depth, within a range of 50mm. Levers located beneath the seat.	M
6.	Adjustable Reclining Tension	Four tension adjustments. Pre-sets to suit any body shape and posture. Dial located under the seat	M
7.	Weight Limit	550 lbs. in a multi-shift environment. Weight-dispersing Suspension	M
8.	5 Lockable Recline Positions	Lock and unlock the backrest, alternating between free recline mode and five recline positions. Controlled by the lever at the armrest.	M
9.	Adjustable Seat Height	Adjustable seat height, Controlled by the lever at the right armrest. (110mm) Adjustable Lumbar Support Adjustable Articulating Headrest	M
10.	Back Type	Mesh	M
11.	Seat Type	Leather	M
Total			M

- c. One workstation, with an office chair and two (2) visitor's chairs.
- d. Any other infrastructure required to operationalize the Operational Centre of the UTM System.
- e. All furniture shall all be designed and mounted for maximum comfort, efficiency, safety, and ease of use.

viii. **Physical Security**

- a. The Operations Centre should have a console indicating any unregistered users who may want to get in.
- b. The operations Centre should have a redundant access control based on biometrics, face recognition, numeric input and a punching card. All the doors shall have these devices, outside and inside. This system should be an extension of the KCAA access control system. The vendor shall install the devices, maglocks and undertake all the required cabling and accessories.

2.2.22 Operations Centre Hardware

- ix. Panels and associated System Units – Required to support five (5) monitoring stations
 - a. They shall work with their respective Panels.
 - b. The panels MUST support touch screen operations as well as user input through other input devices.
 - c. Respective keyboards, mice and other input devices shall be part of the cost.
 - d. The panels shall all be designed and mounted for maximum comfort, efficiency, safety, and ease of use.
- x. All-in-one PCs – five (5).

<u>All-in-one Desktop Computers – Operations Centre</u>			
	<u>Item</u>	<u>Specifications Required</u>	<u>M</u>
1.	PC Type	All-in-one.	M
2.	Make and Model	Microsoft Surface Studio or equivalent	
3.	Quantity	Five (5)	M

4.	Manufacturer's Authorization	<ul style="list-style-type: none"> Manufacturer's Authorization to be provided. Product data sheets to be provided. 	M
5.	Processor	<ul style="list-style-type: none"> At least Intel® Core™ i7-7500 Processor (Quad Core, 6MB, 4T, 3.2GHz, 65W). 	M
6.	Memory	8GB (1x4G) 1600MHz DDR3L Memory	M
7.	Operating System	Windows 11 Professional - One license per device within a volume licensing scheme of 55 Volume Licenses.	M
8.	Storage	At least 512 GB Solid-State Drive.	M
9.	Monitor	<ul style="list-style-type: none"> Colour: White Screen: 28" PixelSense™ Display Resolution: 4500 x 3000 (192 PPI) Color settings: sRGB, DCI-P3, and Vivid Individually color-calibrated display Aspect Ratio: 3:2 Touch: 10 point multi-touch Supports Surface Pen with tilt activation, Surface Dial⁵ on-screen interaction, and Zero Gravity Hinge 	M
10.	Optical Drive	8x Slimline DVD+/-RW Drive.	M
11.	Ports	<ul style="list-style-type: none"> 4 – USB 3.0 (2 side, 2 rear). 2 – USB 2.0 (rear). HDMI 1.4. Display Port 1.2. RJ-45. 1 Universal Headset (Side). Line-out 1 Rear. 	M
12.	Graphics	Intel® Integrated Graphics.	M
13.	Keyboard	<ul style="list-style-type: none"> White Multimedia Keyboard Wired Keyboard - UK (QWERTY) MUST be same brand as PC 	2
14.	Mouse	<ul style="list-style-type: none"> White wired Optical Mouse with scroll wheel and two buttons MUST be same brand as PC 	2
15.	Power supply	220-240V Primary Power Supply, Hot Plug Power Supply,	2
16.	Warranty	1Yr ProSupport and Next Business Day On-Site Service	2
17.	Office	Microsoft Office 365 - One license per device within a volume licensing scheme of 55 Volume Licenses.	M
18.	Extra Slots	<ul style="list-style-type: none"> Supports optional optical disc drive and standard media card reader 1 M.2 connector (Wi-Fi Card) 	2
19.	Wireless Adapters	Intel® Dual Band Wireless 8260 (802.11ac) + Bluetooth	2
20.	PC Stand	Articulating Stand – With view adjustment to interact easily with content in virtually any position.	M
21.	Miscellaneous	<ul style="list-style-type: none"> Mounting of the PCs into their respective desks. Labelling of the PCs, their respective accessories and management of cables (power and network). Connection and configuration of the PCs to the network. Installation of the OS and Office Software. 	4
22.	Security	<p>ington K64615US Desktop Computer and Peripherals Locking Kit. The kit should have a cable trap secures a wired keyboard and mouse to the PC.</p> <p>locking kit should securely secure the Computer to the Desk.</p>	M

xi. Printers

a. Two (2) heavy duty color printer

	Heavy Duty Color Printer		Score
	Item	Specifications Required	
1.	Quantity	Two (2) Heavy Duty Colour Printers	M
2.	Make and Model	HP Color LaserJet Ent MFP M776 Series Printer or equivalent. Indicate make and model of the printer	M
3.	Brochure	Bidders MUST provide/attach a product brochure/ datasheet/ catalogue of the photocopier they are providing	M
4.	Manufacturer's Authorization	Manufacturer's Authorization MUST be provided	M
5.	Print technology	Laser	M
6.	Functions	Print, copy and digital send	M
7.	Duplex copying/printing	Two-sided copying Automatic (standard)	M
8.	Print Speed	<ul style="list-style-type: none"> Print speed black: Normal: Up to 45 pm. Print speed color: Normal: Up to 45 pm. First page out: at least 7 Seconds. 	M
9.	Print Resolution	1200 x 1200dpi	M
10.	Monthly Duty Cycle	Up to 200,000 pages	M
11.	Processor Speed	<ul style="list-style-type: none"> 1.2 GHz. 	M
12.	Display	Each functional touchscreen with 8.0 in (20.3 cm), (1024x768) LCD (color graphics), smooth gesture, enabled touchscreen	M
13.	Wireless Capability	<ul style="list-style-type: none"> Mandatory, MUST be enabled with purchase of a necessary hardware accessory 	M
14.	Connectivity	USB 2.0 (Hi-Speed) Fast Ethernet 10Base-T/100BaseTX/1000BaseT	M
15.	Support environment	All current Windows operating systems, Mac OS X Version 10.4 or higher, UNIX, LINUX, as well as other operating systems on request.	M
16.	Memory	7GB	M
17.	Internal Storage	<ul style="list-style-type: none"> Standard, 500 GB High-Performance SED Hard Disk (AES 256 hardware encryption or greater) 	M
18.	Paper Handling	<ul style="list-style-type: none"> 100-sheet multipurpose tray. 550-sheet input tray 2. Paper handling input, 550-sheet media input tray 3. 	M
19.	Media Sizes	sheet multipurpose Tray 1: 2.5 x 5 to 12.6 x 18 in; 550-sheet input Tray 2: 5.8 x 5.8 to 11.7 x 17 in; 1x550 and 2x550 tray and stand: 5.8 x 5.8 to 12.6 x 18 in	M
20.	Power source	240V, 50 -60 HZ	M
21.	Network protocol	Minimum TCP/IP, IPX/SPX	M
	Consumables and other Services		
22.	Tonner Kit	Four (4) spare tonner kits for each Color	M
23.	Warranty	At least 1 Year	M
24.	USB Cable	MUST be included in the box	M
25.	Installation	Full setup, installation and configuration of the equipment	M
	All Specifications are Mandatory and MUST all be met		M

xii. Input Devices

xiii. Networks

- a. Redundant TCP/IP links from the Core UTM to Engineering Network (JKIA) based on Fibre Optic.

- b. Any other necessary network installations and configurations required to ensure that the UTM system is operational. The network switches and other related devices should be CISCO.

2.2.23 Remote Operations Tracking

- i. Access the central monitoring console via the internet.
- ii. Should be presented graphically over an interactive webpage.
- iii. Access to this interface should be protected SSL and firewalls.

2.2.24 Cyber Security

Data transmission between endpoints should be encrypted and transferred through a secure channel using HTTPS protocol.

- i. SSL Certificates - KCAA shall provide a valid 2048-bit certificate to be installed on the following servers: -
 - a. UTM Server
 - b. API Gateway Server
 - c. Web application server
 - d. Any other UTM Component servers

- ii. Firewalls

A Web Application Firewall (WAF) shall be deployed to protect the UTM application from external attacks. The WAF will monitor, filter, and block unwanted inbound and outbound HTTP traffic. The WAF should protect the UTM system against attacks such as cross-site scripting and SQL injection, protected resource access, session high jacking, etc.

- a. Describe in detail the implementation of WAF and provide a diagrammatic architecture
- b. State the requirements for implementing an optimized WAF (hardware and software)
- c. Any licensing that may be required shall be provided by the vendor for the entire contract period

- iii. Reinforcing Cyber Resiliency

The UTM System vendor shall propose an implementable cyber security resilience strategy.

2.2.25 End User Hardware

- i. All-in-one Computers

Technical specifications for a versatile All-in-One Desktop computers

All-in-one Desktop Computers – End-Users			
	<u>Item</u>	<u>Specifications Required</u>	<u>M</u>
1.	PC Type	All-in-one.	M
2.	Make and Model	Microsoft Surface Studio or equivalent	M
3.	Quantity	Six (6)	M
4.	Manufacturer's Authorization	<ul style="list-style-type: none"> ▪ Manufacturer's Authorization to be provided. ▪ Product data sheets to be provided. 	M
5.	Processor	<ul style="list-style-type: none"> ▪ At least Intel® Core™ i7-7500 Processor (Quad Core, 6MB, 4T, 3.2GHz, 65W). 	M
6.	Memory	8GB (1x4G) 1600MHz DDR3L Memory	M
7.	Operating System	Windows 11 Professional - One license per device within a volume licensing scheme of 55 Volume Licenses.	M
8.	Storage	At least 512 GB Solid-State Drive.	M
9.	Monitor	<ul style="list-style-type: none"> ▪ Colour: White ▪ Screen: 28" PixelSense™ Display ▪ Resolution: 4500 x 3000 (192 PPI) ▪ Color settings: sRGB, DCI-P3, and Vivid ▪ Individually color-calibrated display 	M

		<ul style="list-style-type: none"> Aspect Ratio: 3:2 Touch: 10-point multi-touch Supports Surface Pen with tilt activation, Surface Dial⁵ on-screen interaction, and Zero Gravity Hinge 	
10.	Optical Drive	8x Slimline DVD+/-RW Drive.	M
11.	Ports	<ul style="list-style-type: none"> 4 – USB 3.0 (2 side, 2 rear). 2 – USB 2.0 (rear). HDMI 1.4. Display Port 1.2. RJ-45. 1 Universal Headset (Side). Line-out 1 Rear. 	M
12.	Graphics	Intel® Integrated Graphics.	M
13.	Keyboard	<ul style="list-style-type: none"> White Multimedia Keyboard Wired Keyboard - UK (QWERTY) MUST be same brand as PC 	2
14.	Mouse	<ul style="list-style-type: none"> White wired Optical Mouse with scroll wheel and two buttons MUST be same brand as PC 	2
15.	Power supply	220-240V Primary Power Supply, Hot Plug Power Supply,	2
16.	Warranty	1Yr ProSupport and Next Business Day On-Site Service	2
17.	Office	Microsoft Office 365 - One license per device within a volume licensing scheme of 55 Volume Licenses.	M
18.	Extra Slots	<ul style="list-style-type: none"> Supports optional optical disc drive and standard media card reader 1 M.2 connector (Wi-Fi Card) 	2
19.	Wireless Adapters	Intel® Dual Band Wireless 8260 (802.11ac) + Bluetooth	2
20.	PC Stand	Articulating Stand – With view adjustment to interact easily with content in virtually any position.	M
21.	Miscellaneous	<ul style="list-style-type: none"> Mounting of the PCs into their respective desks. Labelling of the PCs, their respective accessories and management of cables (power and network). Connection and configuration of the PCs to the network. Installation of the OS and Office Software. 	4
22.	Security	Kensington K64615US Desktop Computer and Peripherals Locking Kit. The kit should have a cable trap secures a wired keyboard and mouse to the PC. The locking kit should securely secure the Computer to the Desk.	M

ii. System Administration Laptops

	<u>Systems Administration Laptops</u>		
	<u>Item</u>	<u>Specifications Required</u>	<u>Score</u>
1.	Required Product	Microsoft Surface Books 3 (15 Inch) or equivalent.	M
2.	Required Quantity	Three (3)	
3.	Manufacturer's Authorization	<ul style="list-style-type: none"> Manufacturer's Authorization to be provided. Product data sheets to be provided. 	M
4.	Processors	Core i7-8650U (4.2GHz).	M
5.	Memory	32 GB RAM.	M
6.	Storage	At least 2048 MB Solid State Drive.	M
7.	Display Size	<ul style="list-style-type: none"> Screen: 15" PixelSense™ display. 1600:1 contrast ratio. 	M
8.	Display Resolution	<ul style="list-style-type: none"> Resolution: 3240 x 2160. Aspect ratio: 3:2. 	M

		<ul style="list-style-type: none"> ▪ 260PPI. ▪ Touch: 10 point multi-touch. ▪ De-touchable with 4 modes of use. 	
9.	Native Graphics	▪ Intel UHD Graphics 620.	M
10.	Discrete Graphics	▪ NVIDIA GTX 1060 (6GB).	M
11.	Mouse	Logitech Wireless Marathon Mouse M705 With 3-year Battery Life.	M
12.	Noise Cancelling Headset	Beats by Dr. Dre Wireless Headphones. Rechargeable battery lasts 12 hours while connected through Bluetooth	M
13.	Security	Kensington Surface Book Locking Kit. The cable should be lockable with a 4-digit code and a minimum of three (3) metres. The locking kit should securely secure the Computer to the Desk.	M
14.	Input	De-touchable keyboard and a Stylus Pen.	M
15.	Surface Book Security	<ul style="list-style-type: none"> ▪ Facial recognition. ▪ Microsoft Surface Tablet Lock with 4 PIN Password or equivalent. 	M
16.	Ports	<ul style="list-style-type: none"> ▪ Two full-size USB 3.0. ▪ Full-size SD™ card reader. ▪ Headset jack. ▪ Mini DisplayPort. 	M
17.	Wireless	<ul style="list-style-type: none"> ▪ 802.11ac Wi-Fi wireless networking. ▪ IEEE 802.11a/b/g/n compatible. ▪ Bluetooth 4.0 wireless technology. 	M
18.	Docking Station	<ul style="list-style-type: none"> ▪ 2 Mini DisplayPorts. ▪ 1 Gigabit Ethernet port. ▪ 4 USB 3.0 ports. ▪ 1 Audio out port. ▪ External power supply. 	M
19.	Carry Case	<ul style="list-style-type: none"> ▪ OGIO Carbon or BOVIC or Kensington Laptop Backpack. ▪ Padded Padded side entry compartment fits 15" laptop ▪ Easy grab side and top handle with padded PU leather wrap. ▪ Padded tablet sleeve in main compartment. ▪ Integrated Pullman pass-through strap for securing backpack to carry-on luggage. ▪ Material: 600D Poly Oxford, 420D Poly Shadow Ripstop. ▪ Lifetime warranty against manufacturer's defects. ▪ Exterior Dimensions: 18" x 13" x 4.5". 	M
20.	OS	Microsoft Windows 11 Pro.	M
21.	Battery and Power	<ul style="list-style-type: none"> ▪ Up to 12 hours of video playback. ▪ Power Supply with the Universal Travel Adapter included. 	M
22.	Office	Microsoft Office 365 included	M
23.	HDMI Adapters	An adapter for converting USB C port to HDMI and VGA	M
24.	LAN Adapter	An adapter for using USB C to access Local Area Network	M
25.	External Drives	32GB Flashdisk and 2TB Harddrive.	M
Total (All requirements are mandatory)			M

iii. Laptops
Technical specifications for other laptop computers

	<u>Laptops</u>		
	<u>Item</u>	<u>Specifications Required</u>	<u>Score</u>
1.	Required Product	Microsoft Surface Books 3 (15 Inch) or equivalent.	M
2.	Required Quantity	Five (5)	
3.	Manufacturer's Authorization	<ul style="list-style-type: none"> Manufacturer's Authorization to be provided. Product data sheets to be provided. 	M
4.	Processors	Core i7-8650U (4.2GHz).	M
5.	Memory	16 GB RAM.	M
6.	Storage	At least 512 MB Solid State Drive.	M
7.	Display Size	<ul style="list-style-type: none"> Screen: 15" PixelSense™ display. 1600:1 contrast ratio. 	M
8.	Display Resolution	<ul style="list-style-type: none"> Resolution: 3240 x 2160. Aspect ratio: 3:2. 260PPI. Touch: 10-point multi-touch. De-touchable with 4 modes of use. 	M
9.	Native Graphics	<ul style="list-style-type: none"> Intel UHD Graphics 620. 	M
10.	Discrete Graphics	<ul style="list-style-type: none"> NVIDIA GTX 1060 (6GB). 	M
11.	Mouse	Logitech Wireless Marathon Mouse M705 With 3-year Battery Life.	M
12.	Noise Cancelling Headset	Beats by Dr. Dre Wireless Headphones. Rechargeable battery lasts 12 hours while connected through Bluetooth	M
13.	Security	Kensington Surface Book Locking Kit. The cable should be lockable with a 4-digit code and a minimum of three (3) metres. The locking kit should securely secure the Computer to the Desk.	M
14.	Input	De-touchable keyboard and a Stylus Pen.	M
15.	Surface Book Security	<ul style="list-style-type: none"> Facial recognition. Microsoft Surface Tablet Lock with 4 PIN Password or equivalent. 	M
16.	Ports	<ul style="list-style-type: none"> Two full-size USB 3.0. Full-size SD™ card reader. Headset jack. Mini DisplayPort. 	M
17.	Wireless	<ul style="list-style-type: none"> 802.11ac Wi-Fi wireless networking. IEEE 802.11a/b/g/n compatible. Bluetooth 4.0 wireless technology. 	M
18.	Docking Station	<ul style="list-style-type: none"> 2 Mini DisplayPorts. 1 Gigabit Ethernet port. 4 USB 3.0 ports. 1 Audio out port. External power supply. 	M
19.	Carry Case	<ul style="list-style-type: none"> OGIO Carbon or BOVIC or Kensington Laptop Backpack. Padded Padded side entry compartment fits 15" laptop Easy grab side and top handle with padded PU leather wrap. Padded tablet sleeve in main compartment. Integrated Pullman pass-through strap for securing backpack to carry-on luggage. Material: 600D Poly Oxford, 420D Poly Shadow Ripstop. Lifetime warranty against manufacturer's defects. Exterior Dimensions: 18" x 13" x 4.5". 	M
20.	OS	Microsoft Windows 11 Pro.	M
21.	Battery and Power	<ul style="list-style-type: none"> Up to 12 hours of video playback. 	M

		▪ Power Supply with the Universal Travel Adapter included.	
22.	Office	Microsoft Office 365 included	M
23.	HDMI Adapters	An adapter for converting USB C port to HDMI and VGA	M
24.	LAN Adapter	An adapter for using USB C to access Local Area Network	M
25.	External Drives	32GB Flashdisk and 2TB Harddrive.	M
Total (All requirements are mandatory)			M

iv. Tablets

No.	Item	Specification Required	Score
1.	Product	Microsoft Surface Pro 7 or Equivalent	M
2.	Dimensions	9.65" x 6.9" x 0.33" (245 mm x 175 mm x 8.3 mm)	M
3.	Display	Screen: 10.5" PixelSense™ Display Resolution: 1920 x 1280 (220 PPI) Aspect ratio: 3:2 Contrast ratio: 1500:1 Touch: 10-point multi-touch Corning® Gorilla® Glass 3	
4.	Quantity	Six (6) Tablets	
5.	Memory	8GB LPDDR3	M
6.	Make/Model	Surface Pro 7+ for Business or equivalent	M
7.	Processor	Dual-core 10th Gen Intel® Core™ i3-10100Y Processor Dual-core Intel® Pentium® Gold 6500Y Processor (Education, government, or public sector institutions only)	
8.	Security	TPM 2.0 chip for enterprise security Enterprise-grade protection with Windows Hello face sign-in Windows enhanced hardware security	M
9.	Software	Windows 11 Pro or Windows 10 Pro Preloaded Microsoft 365 Apps ⁵ Microsoft 365 Business Standard, Microsoft 365 Business Premium, or Microsoft 365 Apps 30-day trial ⁶	M
10.	Battery life ¹	Wi-Fi: Up to 11 hours of typical device usage	M
11.	Graphics	Intel® UHD Graphics 615	M
12.	Storage ⁴	eMMC drive: 64 GB SSD drive: 128 GB, 256 GB (LTE)	M
13.	Wireless	Wi-Fi 6: IEEE 802.11 a/b/g/n/ac/ax compatible Bluetooth Wireless 5.0 technology LTE Advanced: Qualcomm® Snapdragon™ X16 LTE modem LTE Advanced: Up to 600 Mbps LTE Advanced ² with nanoSIM support. Bands supported: 1, 2, 3, 4, 5, 7, 8, 12, 13, 14, 19, 20, 25, 26, 28, 29, 30, 38, 39, 40, 41, 66 LTE Advanced: Assisted GPS and GLONASS support LTE Advanced: eSIM support	M

14.	Warranty	1-year limited hardware warranty	M
15.	Pen compatibility	Surface Go 3 supports Microsoft Pen Protocol (MPP)	M
Total			

- v. A fully functional UAS for testing various functionality and integrations.
 - a. Quantity Required – One (1)
- vi. Device Transponders
1,000 transponders, acquisition cost to be transferred to the Owner.
- vii. IP Telephone Sets
Quantity - 6
- viii. Mouse 12 Pieces

No.	Item	Requirement	Score
1.	Required Product	Microsoft Surface Go 3 or MX 2 Mouse or equivalent	M
2.	Dimensions	Height: 4.92 in (124.9 mm) Width: 3.32 in (84.3 mm) Depth: 2.01 in (51 mm) Weight: 4.97 oz (141 g) Unifying USB Receiver Height: 0.72 in (18.4 mm) Width: 0.57 in (14.4 mm) Depth: 0.26 in (6.6 mm) Weight: 0.07 oz (2 g)	
3.	Dimensions	Height: 4.92 in (124.9 mm) Width: 3.32 in (84.3 mm) Depth: 2.01 in (51 mm) Weight: 4.97 oz (141 g) Unifying USB Receiver Height: 0.72 in (18.4 mm) Width: 0.57 in (14.4 mm) Depth: 0.26 in (6.6 mm) Weight: 0.07 oz (2 g)	M
4.	Unifying USB Receiver	Required: Available USB port Windows® 10 or later macOS 10.15 or later	M
5.	Bluetooth®	Required: Bluetooth low energy technology Windows 10 or later macOS 10.15 or later	M
6.	Sensor technology	Darkfield high precision Nominal value: 1000 dpi DPI (Minimal and maximal value): 200 to 4000 dpi (can be set in increments of 50 dpi)	M
7.	Sensor technology	Darkfield high precision Nominal value: 1000 dpi DPI (Minimal and maximal value): 200 to 4000 dpi (can be set in increments of 50 dpi)	M
8.	Battery	Rechargeable Li-Po battery At least three hours of use from a one-minute quick charge	M
9.	Quantity	Twelve (12)	M
Mandatory			M

2.2.26 Services

- i. Due diligence:

- a. KCAA shall perform a due diligence after Tender evaluation process and before award of tender which may include but not limited to: -
 - i. Interviewing technical staff.
 - ii. Verification of company premises.
 - iii. Visiting reference sites.
 - iv. Verification of performance of the UTM at refereed sites.
 - v. Demonstration of the proposed system at a site to be agreed.
 - ii. Project Management
 - a. Project Methodology – A detailed project methodology to be provided based on the understanding of the bidder
 - b. Project manager
 - i. Must be fully qualified with PMP/PRINCE2
 - ii. Must have successfully implemented three (3) projects of similar complexity and scope
 - c. Technical staff
 - i. Must be fully qualified with relevant certifications for areas of expertise
 - ii. The required areas of expertise are: - UTM, CNS Systems, Systems Development and Systems Administration
 - iii. Each technical officer must have successfully implemented three (3) projects of similar complexity and scope
 - d. Project Implementation Plan
 - i. Should be provided with details and milestones indicated
 - ii. The project implementation period should be a maximum of nine (9) months from kick-off to commissioning.
 - e. Project sign-offs
- iii. Quality Assurance
 - a. Factory acceptance test criteria.
 - i. To be undertaken at the system factory.
 - ii. Detailed test criteria to be provided.
 - iii. Must be undertaken for at least five (5) working days by ten (10) members of the KCAA project team.
 - iv. All applicable costs to be borne by the bidder.
 - b. Factory acceptance test. The contractor shall send the FAT Test Plan, which shall include in part, the tests to be carried out and the method to be used to KCAA 4 weeks in advance for purposes of evaluation. Upon approval, KCAA shall inform the contractor the suitability of the FAT tests in writing. Should problems materialize during the FAT or should the FAT result be deemed unsatisfactory by KCAA, the problems shall be corrected and the status be mutually verified and agreed during SAT.
 - c. System modules test strategy
 - d. Site acceptance test criteria
 - e. Site acceptance test
 - f. All costs of the factory acceptance shall be borne by the vendor. These costs include but not limited to economy class airfare, VISAs, terminal transportation and Daily Subsistence Allowance (DSA)
- iv. Critical Design Review
 - a. On-site sessions to be undertaken in expected UTM Operations Centre, ICT datacentres (remote and primary), JKIA tower, Engineering equipment rooms at JKIA, Wilson Airport tower, and Wilson Engineering equipment room.
 - b. Documentation session to be undertaken in a 4-star hotel out of town.
 - c. It should be a full-day conference for a period of five (5) days.
 - d. The estimated number of participants is fourteen (14) members of the project team.

- e. All costs of the critical design review shall be borne by the vendor. These costs include but not limited to conferencing facilities, economy class airfare, VISAs, terminal transportation and DSA
- v. Technical Training
 - a. To be undertaken in the vendor's factory for the KCAA UAS team and multiagency team as well.
 - b. A training period of two (2) weeks shall include all the operational aspects of the UTM with the following key modules;
 - The core OS of the UTM – Certified to cover installation, configuration, networking and basic operations.
 - Webserver configuration, creation, mapping and management of websites.
 - Database – Certified to cover installation, configuration, creation of databases, creation of tables, modification of tables, data insertion, selection and manipulation both in the CLI and GUI.
 - A fully simulated KCAA UTM setup with all its components; Webservers, configurations, clusters, databases, mapped networks and integrations.
 - Technical knowledge of integrations and technologies applied. These include ATM, ROMS, CRONOS, Top Sky, ARMS and AMSS.
 - A profound practical technical training comprising of the KCAA UTM configurations, clustering, DBs and integrations. This should include case tests and full system rebuilds within the simulated environment.
 - UTM troubleshooting; health and service status checks, fault checks, performance checks, log reviews and interpretation, recovery and performance optimization.
 - UTM backups, restorations, failovers and failbacks between the primary and backup sites.
 - Training on big data and analytics focusing on UTM data. The outputs to this process will generate trends and predictive reports with future insights that shall be used by management for decision making.
 - Undertake Reports Building and Generation for Adhoc User requests and include the templates in the system for reuse.
 - c. A training period of one (1) week shall include all the operational aspects of the UTM with the following key modules;
 - A fully simulated KCAA UTM setup with all its components; Webservers, configurations, clusters, databases, mapped networks and integrations.
 - User Management
 - Configuration & Customization Panel
 - Flight Requests
 - Geo Engine & Airspace Management
 - Non-Cooperative Engine
 - Flight Management
 - Real-Time Traffic Monitoring and Surveillance
 - Recording of Traffic Movement
 - Transponders
 - Deconfliction Module/Detect and avoid
 - Robust Risk Management
 - Communications & Alerts Module
 - Digital Surface Modelling
 - Reporting and Analytics
 - d. The estimated number of participants is six (6).
 - e. The applicable costs, including logistics and subsistence allowances shall be borne by the vendor. These costs include but not limited to conferencing facilities, economy class airfare, VISAs, terminal transportation and DSA
- vi. Operational Training

- a. To be undertaken in the vendor's factory for the KCAA UAS team and multiagency team as well.
- b. The training period of two (2) weeks shall include all the operational aspects of the UTM with the following key modules;
 - User Management
 - Configuration & Customization Panel
 - Flight Requests
 - Geo Engine & Airspace Management
 - Non-Cooperative Engine
 - Flight Management
 - Real-Time Traffic Monitoring and Surveillance
 - Recording of Traffic Movement
 - Transponders
 - Deconfliction Module/Detect and avoid
 - Robust Risk Management
 - Communications & Alerts Module
 - Digital Surface Modelling
 - Reporting and Analytics
- c. The estimated number of participants is eight (8).
- d. The applicable costs, including logistics and subsistence allowances shall be borne by the vendor. These costs include but not limited to conferencing facilities, economy class airfare, VISAs, terminal transportation and DSA
- vii. ATCO/AIS/Engineering Training
 - a. To be undertaken in a 4-star hotel outside Nairobi.
 - b. Banners, digital and physical shall be produced to increase awareness.
 - c. It should be a full-day conference for a period of five (5) days.
 - d. The estimated number of participants is sixty (60). Due to operational constraints of the participants shifts, the conference shall be run for two (2) sessions in consecutive weeks with each session having thirty (30) participants.
 - e. The applicable costs, including conferencing facilities, logistics and subsistence allowances shall be borne by the vendor.
- viii. KCAA Staff Sensitizations

This shall be a conference arranged by the vendor with the assistance of KCAA. The requirements are as follows: -

 - a. This shall be undertaken virtually.
 - b. Digital content shall be produced and shared to create awareness.
- ix. Industry Sensitization

This shall be a conference arranged by the vendor with the assistance of KCAA. The requirements are as follows: -

 - a. To be undertaken in a 4-star hotel in Nairobi.
 - b. Banners, digital and physical shall be produced to increase awareness.
 - c. It should be a half-day conference with tea and lunch.
 - d. The estimated number of participants is 100.
 - e. The applicable costs for the conference facility and any logistics shall be borne by the vendor.

2.2.27 Licensing Framework

- i. The core UTM licences should be perpetual.
- ii. The user licencing should accommodate all Internal KCAA users and stakeholders as well as UAS Owners/Operators. The system at any given point should be able to accommodate at least one hundred and fifty (150) consecutive/parallel users.

2.2.28 Interoperability

- i. With UAS tracking chipsets
- ii. Jamming systems
- iii. Counter-UAS systems

2.2.29 Scalability, Maintenance and Support

- i. Scalability
- ii. OEM Support
- iii. SLA

2.2.30 Flight Planning and Billing

Flight Planning and ANS Billing for BVLOS Operations

Billing Management Integration with the KCAA ARMS manufactured by IDS AirNAV.

3. Interface and GENERIC Requirements

3.1 User Interfaces

The user interfaces should be user friendly and intuitive utilizing graphics to assist the user. The web interfaces should be developed using the latest web development technologies like HTML5, Teleriks, AJAX etc to ensure a rich user experience. The web interfaces should work in the major browsers without rendering problems i.e. Internet explorer, Mozilla, chrome and opera.

3.2 Software Interfaces

All the Reports and Printable Documents should be in default PDF Format. However, the system should allow the same reports to be exported to RTF and excel. Documents to be uploaded by users should also be in PDF and excel depending on the type document.

3.3 Mobile App Interfaces

In addition to web-based access, the UTM shall also incorporate a fast mobile App compatible with iOS and Android.

4. Future Improvements

- Consider a viable VCCS, probably software based.
- Inclusion of a module for supporting weather
- Seamless integration with the envisioned ASSR Integrated Suite where applicable.
- Integration with the KCAA MOR and VRS reporting systems.

5. Recommendations

- i. Identification and preparation of a UTM Operations Centre.
- ii. Billing Structure for UAS to be developed for ANS.
- iii. Sensitizations to the regional security committees and other UAS stakeholders to be undertaken by the UTM Office.
- iv. Attendance by members of the UTM taskforce to two (2) critical UTM conventions in January/February 2022. Attendance to these conventions shall add imperative knowledge to the UTM implementation process as well as operationalization. The proposed conventions are: -
 - a. International Conference on Drones and Unmanned Aircraft Systems in Melbourne, Feb 2022.
 - b. Commercial UAV Expo Europe – Amsterdam Drone Week – Jan 2022.
- v. 1,000 transponders, acquisition cost to be transferred to the Owner. This shall require further deliberations on the modalities.
- vi. The Government should consider procuring and installing a Country-wide Counter-UAS System that will be integrate-able with the proposed UTM System. This shall ensure that critical infrastructure and vital installations are secured from possible UAS related threats.
- vii. The UTM System viewership to be devolved to the Country's Regions and Counties to be viewed by the relevant security teams.