

LTA for Use of Unmanned Aerial Systems (UAS) for Mapping, Situation Monitoring and Risk-Informed Programming in Malawi

1. IDENTIFICATION

LTA Duration	Initial 2-year period, with potential for 1-year extension on mutual agreement and good performance
Anticipated Start Date	Quarter 2 2019
Reference	LRPS-2019-9146751

2. BACKGROUND AND OBJECTIVES:

Addressing global challenges to achieve economic, environmental, and social sustainability requires a combination of approaches including technology driven ones. Technological advancements are progressing at a lightning speed while our ability to harness the power and potential of such technologies lag behind due to short supply of trained workforce around the globe. In many parts of Africa, drones are being used to provide innovative solutions to challenges in a wide array of sectors from wildlife management, agriculture, humanitarian response and health. Drones have become smaller, smarter, and less expensive making it possible for a widespread adoption in developed as well as underdeveloped countries.

In Malawi, drones are increasingly being deployed for humanitarian and development purposes. UNICEF has led these efforts, including integrating drones into HIV and health supply chain management, responding to flood emergencies, launching a drone testing corridor, mapping and monitoring infrastructure, supporting development of the national regulatory framework and a cadre of drone pilots, and integrating drones into the national disaster preparedness and response framework. UNICEF Malawi already combines drone acquired images with Artificial Intelligence to create “vulnerability maps” in order to support responders in the fight against the current cholera outbreak. Additionally, UNICEF Malawi plans to develop a data strategy for aerial and satellite imagery, and other types of Big Data (e.g. geospatial data, social media, crowdsourced data, sensor data) integration and analysis. These and other proof-of-concept projects have demonstrated that drones can play an important role in achieving development and humanitarian objectives.

- a. To meet the rising need for use of drones, UNICEF Malawi wishes to identify a number of Unmanned Aerial System (UAS) providers to provide services for humanitarian response and mapping for programming, including monitoring, change detection, and risk-informed assessments to support the Government of Malawi and UNICEF Malawi. These products could be used in disaster risk reduction, early warning activities or emergency response, such as floods and drought monitoring among others. The use of UAVs will be utilized to produce geo-referenced orthomosaics and/or 3D models of topography and key infrastructures (e.g. health facilities, water points, latrines, schools, informal settlements, etc.), :
 - i. Mapping for Programming:
 - ii. Monitoring
 - iii. Change and feature detection
 - iv. Risk-informed assessment

3. LONG TERM AGREEMENT:

LTA for Use of Unmanned Aerial Systems (UAS) for Mapping, Situation Monitoring and Risk-Informed Programming in Malawi

UNICEF Malawi is looking to establish Long Term Agreements (LTAs) for UAV services as outlined in this TOR. The LTA will be established for an initial period of 24 months, with the option to extend for a further 12 months subject to good performance and mutual agreement.

The LTA does not give any obligation of work by UNICEF to the supplier, but sets out the terms of the relationship. When UNICEF has specific services to be undertaken a separate Institutional Contract will be raised by UNICEF for the services and associated costings as included in the LTA. Any services provided under the LTA should be provided in accordance with the KPI's as outlined by UNICEF.

UNICEF reserves the right to terminate the individual contract and cancel the LTA at any time.

4. SCOPE OF WORK:

To provide the UAV services the Company will work with UNICEF and the Malawi Department of Civil Aviation (MDCA) and other public authorities. It will be the Company's responsibility to comply with the safety standards outlined in paragraph 7 and comply with the regulatory requirements outlined in paragraph 7.

a. Responsibilities

- v. Provide its own UAV hardware, accessories, accompanying software, systems and manpower. The UAV hardware, accessories, accompanying software and systems must comply with the minimum technical criteria outlined in paragraph 6.
- vi. Provide image processing. The image analysis software must be capable of adhering to the image processing requirements outlined in Section 4 c. under key products. Any products must be delivered to UNICEF Malawi within 2 - 5 days and be compatible with common GIS software programs (ArcGIS, QGIS, Global Mapper, ERDAS etc).
- vii. Ensure Certificate of Authorization has been granted and other necessary clearances (e.g. by Air Traffic Control) have been obtained before commencement of any flights.

b. Key Activities

- i. Provision of necessary information to the MDCA to meet requirements for a Certificate of Authorization and to maintain safety and non-interference with other civil and military flight operations.
- ii. Documentation and submission of flight plans, flight results, including time/distance travelled, flight path considerations, challenges encountered and any information relevant to the UNICEF Malawi CO or MDCA.
- iii. Process the imagery and supply results to UNICEF Malawi CO and relevant government agencies.

The Company must be able to deliver the products listed below. These products must be able to achieve the objectives stated in paragraph 2 a,b,c,d.

c. Primary Products

LTA for Use of Unmanned Aerial Systems (UAS) for Mapping, Situation Monitoring and Risk-Informed Programming in Malawi

- i. High quality, high resolution raw imagery including position information (required resolution ranges:
 - a) 8 -10 cm/pixel,
 - b) 5 - 7 cm/pixel,
 - c) 2 – 4cm/pixel
 - d) below 2cm/pixel
- ii. image overlap:
 - a) 70%-80%,
 - b) 80% - 90%
- iii. High quality and high resolution georeferenced orthomosaics. Required resolution ranges:
 - a) 8 -10 cm/pixel,
 - b) 5 - 7 cm/pixel
 - c) 2 – 4cm/pixel,
 - d) below 2cm/pixel
- iv. Digital Elevation Models (DEM), Digital Surface and Digital Terrain Models (DSM and DTM)
- v. Combine georeferenced orthomosaics and DSM to produce 3-D Mesh
- d. Secondary Products
 - i. Video feeds, including live video
 - ii. IR imagery and LIDAR data
 - iii. Metadata for all products. The specifications of the metadata can be found in Annex B.

5. WORKING LOCATIONS:

The Company will require its own personal office or home space from which to work. When required, the Company shall be expected to attend meetings at a variety of locations in Malawi including UNICEF Malawi offices and MDCA offices. However, most of the work will take place in the field in various locations in Malawi, including in remote and hard to reach areas.

6. MANDATORY TECHNICAL REQUIREMENTS:

Following minimum technical requirements must be met. Please note that these are minimum requirements. Bidders can provide alternate solutions which exceed these minimum requirements.

a. UAVs and Flight Management:

- i. Contain a GPS onboard which guides the UAV for navigation during flights and provides coordinates for the images taken and a second GPS providing exclusively coordinates for images taken; optionally INS (Inertial Navigation System) onboard the UAV to generate highly accurate x, y, z measurements.

LTA for Use of Unmanned Aerial Systems (UAS) for Mapping, Situation Monitoring and Risk-Informed Programming in Malawi

- ii. Full frame optic camera that covers wide surface area to capture high-resolution, georeferenced RGB (red-green-blue color model) images;
 - a) Availability of a second camera for video to provide live video feeds during flight and antenna for transmitting the live feeds from the UAV to the ground control station;
 - b) An IR sensor onboard the UAV; alternatively, multispectral camera to acquire imagery beyond visible light;
 - c) Optionally, a Light Detection and Ranging (LIDAR) sensor.
 - iii. Sufficient data storage to host data from several flights over several days;
 - iv. Full auto-pilot capable of flying autonomously among pre-programmed GPS waypoints;
 - v. Ability to record flight data (to be transmitted via telemetry or stored internally for later download);
 - vi. A user interface to allow new waypoints/destinations to be programmed by a technician in the field;
 - vii. Ability to launch based on minimal user input;
 - viii. Locator Beacon to allow the UAV to be located in the event of flight failure;
 - ix. Programmed safety protocols (i.e. propeller shut-down in the event of failure, no flight if battery level below pre-set threshold and other failsafe mechanisms etc.);
 - x. Ability to self-land (including provision of landing pads if necessary);
 - xi. Ability to operate in hard to reach terrain with limited network connectivity.
- b. Image Capturing and Analysis:
- i. Imagery with the following resolution ranges (cm/pixel): 8 -10 cm, 5 - 7 cm, 2 – 4cm, below 2cm; and image overlap: 70%-80%, 80% - 90%;
 - ii. Robust and spatially correct orthomosaic per each flight;
 - iii. Infrared (IR) images for vegetation health monitoring and identifying heat signatures of objects at night;
 - iv. Post processed spatially organized LIDAR data
 - v. Ability to produce Digital Elevation Models (DEM) showing elevations of the ground; Digital Surface Model (DSM) showing models of buildings, forest canopy, road overpasses, etc, ;
 - vi. Able to proficiently use software as necessary to complete the key activities and products as outlined in section 3;
 - vii. All products should be compatible with any GIS software (ArcGIS, QGIS, Global Mapper, ERDAS etc);
 - viii. Use open source systems when possible;
 - ix. Release findings to the public domain when applicable.
- c. Data transfer
The company should be able to transfer the data to UNICEF via one of the methods:
- i. External drive
 - ii. Cloud-based file transfer
 - iii. FTP server-based transfer
- d. Delivery time
The company should deliver the products/ services within pre-defined deadlines as agreed in contract.

7. SAFETY STANDARDS

LTA for Use of Unmanned Aerial Systems (UAS) for Mapping, Situation Monitoring and Risk-Informed Programming in Malawi

The following safety standards must be complied with

- a. Company must comply with the local and international regulations on air safety.
- b. The company must have a safety and operations manual(s), including:
 - i. Operational protocols
 - ii. Safety protocols
 - iii. Identifying potential risks and mitigation measures
 - iv. Measures to ensure the safety of third parties
 - v. Avoiding or mitigating system failures
 - vi. Protocols for instances of communication and control link lost
 - vii. Safety and operational measures in emergency and other unexpected event
 - viii. Methods of fail-safe mode
 - ix. Methods of mid-air collision avoidance
 - x. Methods of real-time drone tracking (ground station based or other)
 - xi. Other relevant components for safe operation.
- c. UNICEF will not hold any responsibility for any loss / damage to life, property, equipment or valuables resulting due to operations of the Company.

8. REGULATORY REQUIREMENTS

- a. Company must comply with the local and international regulations on air safety.
- b. Company must comply with the local laws.
- c. Company must comply with the local RPA regulation (or RPA operational requirements of Department of Civil Aviation) which set out the requirements for drone platform, certification, drone pilot personnel and their licensing, and other components of the drone operation.
- d. Drones can fly only 400 feet (or equivalent in meters) above the ground level in Malawi Airspace.

9. QUALIFICATIONS AND EXPERIENCE:

- a. The company must be a legal entity. Must be legally registered and a tax payer in the country of registration. It must remain a legal entity and a taxpayer for the duration of the LTA.
- b. At least three (3) years of demonstrated experience in operating UAVs and/or demonstrated experience in using UAVs for imagery and mapping purposes, preferably for humanitarian or development response or under hardship conditions.
- c. Preferred education in remote sensing, photogrammetry, and/ or geography, or training in aerial mapping use cases, fundamentals of drone image capture, techniques for capturing aerial data for mapping.
- d. Authorization to pilot a drone commercially from any accredited drone operation licensing authority inside or outside Malawi and ability to receive flight authorization by the Malawi department of civil aviation.
- e. The company must be able to demonstrate the following criteria in their tender submission:
 - i. Documented results of previous flight tests, including data on reliability of vehicles and safety;
 - ii. Comprehensive safety protocols and processes (Operational manuals, Flight Safety manuals, Fail-safe methods);
 - iii. Ability to determine flight paths between defined points to avoid obstacles;
 - iv. Demonstration of liability insurance;

LTA for Use of Unmanned Aerial Systems (UAS) for Mapping, Situation Monitoring and Risk-Informed Programming in Malawi

- v. Demonstration of Certificate of Authorization to fly from Malawi Department of Civil Aviation (MDCA). Previous experience working with the MDCA is preferable.

10. EMERGENCY AVAILABILITY:

Malawi is a country easily exposed to changes in climate, and its economy overly reliant on agriculture, therefore, it is critical to reinforce disaster preparedness and emergency response. During emergency situations, real-time accurate mapping (i.e within 48 hours) of flood and drought extent, and accounting of affected population and infrastructure damage is integral to response. During the emergencies, it is expected that the company will provide the imagery and logistics for 48-hour Emergency Response and in particular: altitude (up to 120 m) video feeds and/or photos, allowing a rapid overview of emergency conditions; images and data collected to assist in rapid assessment of land and infrastructure damage (e.g. water points, schools, roads), identify temporary settlements, and/or track displaced and affected communities. All available products should comply with Technical Criteria listed above.

Please, note emergency availability is not mandatory.

11. APPLICATION AND EVALUATION PROCESS:

Each proposal will be assessed first on its technical merits and subsequently on its price. In making the final decision, UNICEF considers both technical and financial aspects. The Evaluation Team first reviews the technical aspects of the offer, followed by review of the financial offers of the technically compliant vendors. The proposal obtaining the highest overall score after adding the scores for the technical and financial proposals together, that offers the best value for money will be recommended for award of the contract.

The Technical Proposal should include but not be limited to the following:

- a. Technical Capability
The company should demonstrate how they comply with all elements listed in paragraphs 4 – 10.
- b. Methodology
Detailed Methodology / approach to requirement detailing how to meet or exceed UNICEF requirements for this assignment.
It should also be articulated how the organisation structure itself (either in Malawi or abroad) to support the needs of UNICEF and be able to delivery requirements in a timely manner.
- c. Company Profile
Ensure to include information related to the experience of the company as required and outlined in paragraph 9 of this document.
- d. References
Details of similar assignments undertaken in last three years including the following information:
 - i. Title of Project
 - ii. Year and duration of project
 - iii. Scope of Project

LTA for Use of Unmanned Aerial Systems (UAS) for Mapping, Situation Monitoring and Risk-Informed Programming in Malawi

- iv. Outcome of Project
- v. Web link if available
- vi. Reference / Contact persons

- e. Team Composition
Title and role of each team member

- f. CVs
CV of each team member (including qualifications and experience)
Ensure to include information related to the qualifications and experience of each proposed team member as required and outlined in paragraph 9 of this document.

- g. Any project dependencies or assumptions

The Financial Proposal should include but not be limited to the following:

Costs should be provided by completing the Costing Matrix provided as Annex C to this TOR.

- a. Flying and data processing costs
Costs should be provided by completing the Costing Matrix provided as Annex C to this TOR.
There is a separate matrix provided for each of the following image types and travel costs:
 - i. IR Imagery
 - ii. Lidar Data
 - iii. RGB
 - iv. Travel, In-Country Transportation and Accommodation

Each matrix shows different resolutions for each of the image types. It is not mandatory to provide pricing for all image types/resolutions. If a supplier does not want to provide a quotation for a specific element, then the field should be left blank.

- b. The matrix will allow you to provide your offer depending on your technical capabilities:
 - i. What data (RGB Imagery, IR Imagery, LiDAR Data)
 - ii. With how many hectare/square kilometres you can cover on an average day
 - iii. With what Ground Sampling Distance (GSD)
 - iv. With what overlap

Example: if you are a Malawi based drone company that uses a rotor wing drone to collect RGB imagery data, you will only provide a price per hectare in the RGB index sheet using line "0 - 5 sq km (0 - 500 ha) per day" and leave the other index sheets and lines blank.

If you are a drone company based outside Malawi using a fixed wing drone that can collect near IR, LiDAR and RGB imagery and you are able to map on average 20 sq km you will fill in the respective lines in the index sheets "LiDAR Data", "RGB Imagery" and "IR Imagery".

- c. Important:
 - i. Please indicate the minimum area you are willing to cover overall during one mapping exercise.
 - ii. Please indicate if you are available for Emergency Response, and if the service delivery prices change in the emergency settings.

LTA for Use of Unmanned Aerial Systems (UAS) for Mapping, Situation Monitoring and Risk-Informed Programming in Malawi

iii. Other items that need to be provided are as follows:

- a) Copy of the company registration
- b) Recent Financial Audit Report: Report should have been carried out in the last 2 years and be certified by a reputable audit company.

12. EVALUATION WEIGHTING CRITERIA:

Cumulative Analysis will be used to evaluate and award proposals. The evaluation criteria associated with this TOR is split between technical and financial as follows:

70	% Technical
30	% Financial
<hr/>	
100	% Total

The attached Annex A provides a detailed breakdown of the evaluation criteria.

A submission must obtain a minimum of 70% to pass the technical evaluation. Financial proposals will only be opened where the technical proposal has reached the required pass mark.

Financial proposals will be opened, and points assigned. The maximum score of 30 points will be assigned to the financial proposal that provides the lowest overall cost. Allocations to the activities as well as to program management will also be considered. All other financial proposals will receive scores in inverse proportion according to the following formula:

Score for price proposal A = (Maximum score for price proposal (e.g. 30) * Price of lowest priced proposal)/Price of proposal A.

The technical and financial scoring will then be combined to provide an overall score for each technical compliant proposal. Award will then be made to the proposal that gains the highest score following combining the technical and financial scores.

13. SUPPLIER PERFORMANCE

The supplier will be measured on several performance criteria. Below are the KPI's that will be measured and recorded:

- a. Product Quality
 - i. Images, orthophotomosaics, 3D models with unacceptable quality or resolution below requested in an individual contract.
 - ii. Images, orthophotomosaics, 3D models without accompanied metadata.
 - iii. Images with overlap lower than specified in an individual contract.
 - iv. Images not compatible with GIS software (ArcGIS, QGIS, Global Mapper, ERDAS etc.)
- b. Service and Safety Quality
 - i. The number of days delay in providing the results (from the deadline established in each individual contract).
 - ii. Number of drone crashes.

LTA for Use of Unmanned Aerial Systems (UAS) for Mapping, Situation Monitoring and Risk-Informed Programming in Malawi

iii. Number of safety violations

14. FREQUENCY OF PERFORMANCE REVIEWS

- a. Mid-contract review at 6 months from the date of signing a contract
- b. Annual review after 12 and 24 months.