# SPECIFICATION
# Sprayer RPAS

## 1. Scope

This specification describes the requirements for Sprayer Remotely Piloted Aircraft System (hereinafter referred to as "the Sprayer RPAS") to be used for ultra-low volume spraying of tsetse hotspots by the Ministry of Agriculture Animal Industry and Fisheries of the Government of Uganda (hereinafter referred to as "the End-User").
This specification is for equipment related to the Technical Cooperation (TC) Project RAF5080 "Supporting Area- Wide Tsetse and Trypanosomosis Management to Improve Livestock Productivity- Phase IV".

## 2. Definitions, Acronyms, and Abbreviations

The following definitions, acronyms, and abbreviations shall apply throughout this Specification unless defined otherwise hereinafter:

2.1. RPAS: Remotely Piloted Aircraft System
2.2. GPS: Global Positioning System
2.3. ULV: Ultra Low Volume

## 3. Requirements

3.1. Functional and Performance Requirements

The Sprayer RPAS shall meet the following functional and performance requirements:

3.1.1. The aerial platform shall be a multi-rotor vehicle electrically /battery powered;
3.1.2. The aircraft shall be able to fly for at least 30 minutes with 1 litre of insecticide in the tank at a flight speed during spraying operations of not less than 8 m/s;
3.1.3. The spraying system shall be able to apply ULV spraying with adjustable droplets size and flow rate as specified in the technical requirements;
3.1.4. The RPAS shall operate in a fully autonomous mode completing a pre-programmed flight and spraying plan;
3.1.5. The system is to be supplied with a ground support station for reception of telemetry and sensor data;
3.1.6. The system is to be provided with flight autopilot system and with built-in intelligent dosage control unit, allowing pre-planning of the area to be sprayed and resume function for interrupted spraying operation;
3.1.7. Have the capacity to store all data, specifically telemetry and payload sensor data on board for retrieval after landing;

3.2. Technical Requirements

The Sprayer RPAS and its components shall meet the following technical requirements:

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| 3.2.1. RPA | Maximum take-off mass | < 25 kg |
| | Flight duration with payload and batteries | >= 30 minutes |

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| | (spraying system and 1 litre of insecticide mix) | |
| | Flight speed during spraying operations | >= 8 m/s |
| | Terrain follow feature | altitude sensors (radar/lidar) to allow safe flights at 5 metres above canopy |
| 3.2.2. Spraying system | 2 electrostatic centrifugal nozzles | |
| | Droplet size | adjustable range through varying rotation speed between 50 microns to 100 microns |
| | Spray flow rate | adjustable, shall reach a minimum flow rate of 30 mL/minute |
| | Built-in intelligent dosage control unit | To allow pre-planning of the area to be sprayed and resume function for interrupted spraying operation |
| 3.2.3. Control station | Fully automated flight | |
| | Configurable flight plan before take-off | |
| | Radio telemetry | |
| 3.2.4. Data link | Signal transmission frequency: | 900MHZ |
| | Transmit power: | 250 mW |
| | Accessible transmission distance: | 3km |
| 3.2.5. Accessories | Aluminium case | |
| | LiPo batteries | 6 units of LiPo batteries 6S 16,000 mAh |
| | Battery charger 8-way | |

## 4. Marking

The Sprayer RPAS shall have all safety markings in English language.

## 5. Packing

The Sprayer RPAS, for the shipment to the End-User, shall be packed in accordance with international standards that are applicable for the shipment of this kind of equipment.

## 6. Quality Requirements

6.1. The Sprayer RPAS shall be manufactured, shipped and installed in accordance with the ISO quality assurance system or an equivalent quality assurance system.

6.2. The Contractor shall document the compliance with this quality assurance system.

## 7. Testing and Acceptance

7.1. The Sprayer RPAS, prior to shipment, shall be tested for conformance with manufacturer's performance specifications and the minimum requirements specified herein.

7.2. The Sprayer RPAS, after installation, shall be tested by the Contractor together with the End-User to demonstrate that the performance meets the manufacturer's performance specifications and the minimum requirements specified herein as determined by the IAEA and the End-User.

7.3. The results of the testing of the Sprayer RPAS shall be documented by the Contractor in an acceptance protocol that shall be signed and dated by the End-User.

## 8. Installation and Training

8.1. The Contractor shall install/assemble the Sprayer RPAS at the End-User's location.

8.2. The Contractor shall provide 3 (three) days of training for the operation, troubleshooting and maintenance of the Sprayer RPAS at the End-User's location.

## 9. Deliverable Data Items

The Contractor shall provide 2 (two) complete sets of operation and servicing manuals and technical drawings in the English language.

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