AERONEF REMOTE PILOT
USE AND MAINTENANCE MANUAL

REFERENCE: Servidrone1000-Mu **REVISION**: 2.0 **DATE**: 05/05/2025

CONSTRUCTOR: Francois HOUSSARD **MODEL/TYPE:** Servidrone1000

HOLDER OF THE [TYPE] DESIGN CERTIFICATE (*): Mr Houssard François (Servidrone31)
I declare that the information contained in this file is accurate and that the remotely piloted aircraft complies with the requirements of **2019/945** of 12 march 2019 relating to "unmanned aircraft systems and on third-country operators of unmanned aircraft systems."

TECHNICAL FILE REF. S1000-Tec2 **REV.** 2

Important note:

This document contains the minimum information for the implementation of the safety features required by the regulations.
It does not exempt the remote pilot from providing more detailed instructions on the operation of the aircraft.
In the event of conflicting information with other usage documents, this document shall prevail.
The STS-01 standard scenario will cover visual flight path (VLOS) missions in a manned environment. In this scenario, the aircraft must be maintained at a maximum height of 120m or 15m above an obstacle exceeding 105m, within a radius of 50m around it. The drone's speed must be less than 5m/s.

The pilot must have the license CATS

1. OPERATIONAL LIMITATIONS

The aircraft can be operated in the following scenarios, within the weight limits indicated:

	☒ Class C5
Maximum Mass	11 kg

Wind speed limit allowed: 30 km/h

Minimum and maximum operating temperatures: -5° TO 40°C

Use in wet weather: No

2. SELF-ESTABLISHED

2.1. Hardware

Refer to the Design Authorization for mandatory configuration and equipment requirements.

If in doubt about the approved configuration, contact the design authorization holder to ensure compliance with the technical file.

2.2. Software configuration

- Selecting the GO HOME mode: Run the Qground control software, click on "Alt Go home" to select the altitude in case of automatic return.
- Activation of the altitude limit: Qground control then "limits", on the "height" line, activate "On" and enter the altitude limit in the "max height" box.
- Activation of the lateral distance limit: Qground control, click on "advanced" then "limits", on the "distance limit" line, activate "On" and enter the limit altitude in the "max range" box.

3. PREPARATION FOR THE FLIGHT

Note: This aircraft is used in captive mode, see Appendix 1.

3.1. Determination of Flight Limitations

For each flight, the flight volume within which the remote pilot must ensure that the aircraft is maintained at all times must be defined.

This "limit" volume (ceiling and horizontal limits) is determined by taking into account:

- Trajectories planned to meet the operational objective of the mission, with sufficient margin to take into account inaccuracies in the course keeping (piloting or automatic navigation accuracy, wind, etc.) and the reaction time required by the remote pilot to implement the backup procedures described in § 4;
- The environment of the place of the mission;
- Regulatory constraints (airspace, proximity to an aerodrome, limit of populated areas, etc.);
- Protection obligations towards third parties: other airspace users and third parties on the ground. See in particular § 3.2.

3.2. Minimum exclusion zone for third parties on the ground

The minimum exclusion zone for third parties on the ground must be defined for each flight in order to limit the risks to third parties on the ground in the event of an aircraft crash or emergency landing.

This zone must ensure **that at all times during** the flight the **minimum horizontal distance** from third parties, applicable to the aircraft.

The need for a greater distance must be assessed in terms of expected heights and flight speeds, wind, etc. At a minimum, it must be sufficient to cover the case of a crash following a total loss of power to the controller for which the ballistic range formula can be used:

$V\sqrt{\frac{2H}{g}}$ where g=9.81 m/S where H is the height (in m) and V is the horizontal velocity (in m/s)

3.3. Configuring protections

- Altitude limiter:

  The altitude limiter shall be configured with a height less than or equal to the maximum flight height determined in accordance with § 3.1 above, taking into account, if necessary, the unevenness of the terrain in the area of operation.

  Configuration methods: Run the Qground control software, click on "advanced" then "limits", on the "height" line, activate "On" and enter the limit altitude in the "max height" box.

  Lateral Limits (mandatory for C5 class):

  The limits of the flight zone shall be configured in accordance with the limits determined in accordance with § 3.1 above.

  Configuration methods: Run the Qground control software, click on "advanced" then "limits", on the "distance limit" line, activate "On" and enter the limit altitude in the "max range" box.

- Fail-Safe Functions

  Mode selection: Run the Qground control software, click on "advanced" then "F/S", select "Alt Go home"

  Touchdown point selection: the position is automatically memorized before take-off as soon as the minimum number of satellites (7) is received.

  Flight height: Run the Qground control software, click on "advanced" then "F/S", select "Alt Go home" and enter the return altitude.

- Initialization

  The reference 0 for altitude and the "home" point are automatically recorded before take-off as soon as the minimum number of satellites (10) is received.

3.4. Inspection/Controls

- Check the weather conditions: no rain, wind < 30km/h
- Check the charge of each battery with the appropriate testing device, the charge of each battery should be more than 95%.
- Check the attachment and condition of each propeller
- Check the fastening of the various structural elements
- Power up the remote control and then the multi rotor
- Check the proper functioning of the elements controlled by the radio control
- Verify the proper functioning of the flight mode switching
- Check that the flight parameters are present and error-free in the monitor

See the specific documentation of the Qground control module for the meanings of the different indications

- Engine cut-off test: Unlock the safety of the motors by placing the joysticks in an inverted V (left joystick at the bottom left and right joystick at the bottom right) then accelerate the throttle moderately (20%) within 3 seconds. Push the throttle up to 50% and then set the throttle to 0% to check that the engines have stopped. The engines must be shut down in less than 2 seconds.

- Check that at least 10 GPS satellites have been received correctly
- Battery Checking

4. EMERGENCY PROCEDURES

Note: For use in captive mode, see Appendix 1.

Important note:

The procedures below do not exhaustively describe the actions to be taken by the remote pilot in response to all possible types of anomalies.

They assume that the remote pilot has previously attempted to return to a normal flight situation and are limited to describing the ultimate safeguards when:

- the aircraft cannot be maintained within the intended flight limits, or
- In the event of an out-of-sight flight, the remote pilot no longer has sufficient information to fly the aircraft or ensure that it remains within the intended flight limits.

4. Captive scenario

See Appendix A1

5. MAINTENANCE

- The structure:

Check that the fixing screws are tight before each flight, it is possible to add threadlocker to the screw thread. Check all structural elements and their fixing.

- Engines and propellers:

Before each flight: check the engine fasteners, visually check the condition of the propellers and their fasteners. Check that the axes of rotation of the motors rotate freely.

- The command and control device:

Before each flight: check the battery charge level of the transmitter, which must not be lower than a voltage of 6V. Check the battery charge level of the LCD display, which should not be less than 50% of electrical energy remaining.

- Batteries:

The storage of LIPO batteries must be done at a particular storage voltage in order to preserve a maximum lifespan. It is recommended to use the charger to place the batteries at this storage voltage. See the special manual on LIPO batteries

Charge the 2 batteries used simultaneously on a flight to a full charge. Never use batteries that are charged differently or of very different age and wear at the same time

Every charge, it is best to perform a balancing charge for each battery. Consult the charger manuals to perform the balancing charge.

If a battery has been over-discharged, the charger will no longer accept charging. It is advisable not to use this battery again.

If a battery is deformed (inflation of the envelope), this is often a sign of the end of its life, this battery should no longer be used.

LIPO batteries may pose a risk of explosion and fire when charging. It is recommended to always be present when charging. It is recommended to install a smoke detector nearby and a temperature sensor with an audible alarm on the battery. Finally, it is recommended to charge the LIPO batteries in a closed metal enclosure.

In the event of prolonged storage for more than 6 months, the batteries should be checked for wear.

APPENDIX: use in captive mode

A1. PREPARATION FOR THE FLIGHT

A1.1. Determination of Flight Limitations

See § 3.1 of the manual.

A1.2. Safety distance

The minimum safety distance from third parties on the ground must be at least equal to the length of the restraint cable increased by 5 metres.
The length of cable to be taken into account must take into account, if necessary, the ability to prevent unwinding in the event of an aircraft escaping (see § A2).

Note: in the case of use strictly in accordance with the rules applicable to non-captive aircraft (the restraint system being an additional safety), it is possible to choose, with regard to the safety distance, between the provisions of § 3.2 or those of this §.

A1.3. Elevation limiter

See § 3.3 of the manual.

A1.4. Inspection/Controls

Inspect the condition of the restraint system.

A1. EMERGENCY PROCEDURES

Procedure for blocking the cable in the event of an aircraft escape:

The drone is constrained by a physical link which is the polyamide wire fixed along the hose over an operating distance of 30m maximum, the risk of the aircraft escaping outside its perimeter of operation and in the airspace is zero. The hose that connects the drone to the pump is 30m long. In the event of a failure resulting in loss of control of the aircraft, the remote pilot must immediately:

- Gradually lower the engine throttle (if possible) and then pull on the polyamide cable to recover the aircraft
- The safety zone: provide for the marking of a distance of 30m from third parties so that no one can enter the evolution zone
- The hose is connected to the ground to the pump by successive reducers hot-welded and held in place by clamps. A polyamide cable (KASTKING 100LBS 0.6mm) is attached along the hose, this cable ensures the safety of retention in case the drone becomes uncontrollable. The hose is connected to the drone by clamping the hose which is fitted to the aluminium tube of the spraying system.
- During commissioning, the 30m hose will have to be connected to the brass sleeve (see below the photo) and a clamp must be placed.

<u>Hose attachment on the sprayer side:</u>

Attachment on the pump side: