UAS Inspection and Maintenance SOP

SDU Drone 2.0

0 Version history

Version	Date	Author	Controller	Approval	Changes
1.00	2019-08-01	SDU UAS Center Jussi Hermansen		Kjeld Jensen	Original version
1.01	2019-11-20	SDU UAS Center Kristian Terkildsen		Kjeld Jensen	Added FS maintenance table and parachute maintenance table.
1.02	2020-11-12	SDU UAS Center Kristian Terkildsen Kjeld Jensen		Kjeld Jensen	Formatted maintenance tables with colors designating bench- and field tests. Reduced amount of hours between maintenance. Reference to UAS production test SOP updated.

1 Introduction

This document describes the Standard Operating Procedures for maintenance of the SDU Drone 2.0.

2 End of Mission Inspection

After the conclusion of each flight day, the following should be inspected for damage, loose parts, cracks, and other signs of wear, tear, and failure:

- Check overall assembly; is everything present and looking normal?
- Check all fasteners; are they tight, without being overtightened?
- Check arms; are they securely locked in place?
- Check arms; are the motor mounts horizontal and level with the main body?
- Check landing gear and companion computer mounts; are they secure? ● Check wiring; are any wires pinched or stressed?
- Check wiring; are any wires rubbing against sharp edges?
- Check wiring; are any wires loose?
- Check avionics; are the flight controller, GNSS, telemetry, receiver and other peripherals mounted securely?
- Check motors; when spinning by hand, are they moving freely and without murmur?
- Check propellers; are the bent, cracked or otherwise damaged?

3 Regular Maintenance Intervals

The below table show the maintenance to be performed and the defined interval for said maintenance. **Light purple** represents field tests. **Light cyan** represents bench tests**.**

Part	**Interval½**	**Check for:**
AIR 20A ESC	15 flight hours or 6 months	Calibrate ESCs.
AIR 20A ESC	30 flight hours or 6 months	Perform indoor hover test described in 3.4 in UAS Production Test SOP.
AIR 2216/KV880	15 flight hours or 6 months	Bearings normal (no clicking, rattling or grinding noise) Wires are intact? Motor shaft is running true? No damage to bell or stator? Replace bearings or motor if necessary.
10*5” T-motor propeller	15 flight hours or 6 months	Check for signs of wear, bent plastic, cracks.

Pixhawk 2.1 flight controller	15 flight hours or 6 months	Check all wires for damage, especially along edges. Controller is safely mounted to craft?
Pixhawk 2.1 flight controller	30 flight hours or 6 months	Check for normal operation of all sensors.

Here2 GNSS module	15 flight hours or 6 months	Module is safely attached to craft?
Here2 GNSS module	30 flight hours or 6 months	Check for normal operation. Is reception good?
Airframe	15 flight hours or 6 months	Check for parts damage. Check plastic parts for wear. Check airframe parts for damage/cracking. Check carbon tubes for wear or damage.
mRo telemetry modem	15 flight hours or 6 months	Modules are safely mounted to craft?
mRo telemetry modem	30 flight hours or 6 months	Check for normal operation.
Power wires and data cables	15 flight hours or 6 months	Check for damage, especially along edges, replace where necessary. Are they securely fastened?
Solder joints	15 flight hours or 6 months	Check all solder joints for signs of wear or damage. Redo joints if necessary.
Spektrum satellite receiver	15 flight hours or 6 months	Check for damage, is the module securely fastened?
Spektrum satellite receiver	30 flight hours or 6 months	Check for normal operation. Perform a range check.

Parachute Maintenance

Parts	Inspections periodicity	Actions
- Servomotor	20 deployments	Check the good working without the pin. No sprocket is dammaged. Replace if necessary.
- Piston line	10 deployments	Preventive replacement.
- Piston line	1 deployment	Visual verificiation of non rupture.
- Parachute	1 deployment	Make a folding.
- Parachute	50 deployments	Check the good condition of the lines and fabrics.
- Parachute	100 deployments	Send it to our workshop for a complete inspection.
- Parachute	200 deployments	Preventive replacement.
- Parachute	2 months	If the parachute is not used for a 2 months period, make an unfolding and a complete folding.
- Spring	50 deployments or 1 year	Preventive replacement.
- Tube	1 deployment	Check the tube, the base must not be detach from the tube.

Reference:
https://www.opale-parachutes.com/gb/index.php?controller=attachment&id_attachment=75

FS Maintenance

Part	Interval	Check for:
FSUAV and FSGCS	15 flight hours or 6 months	Signs of damage, loose cables, water damage, etc.
Antennas and feeding cables	15 flight hours or 6 months	Properly and securely installed, no wear and tear. Check that no new hardware blocks FS radio communication.
Battery	15 flight hours or 6 months	Verify capacity.
Radio link range	30 flight hours or 6 months	Perform field test to ensure conformity with functional requirements.
GNSS	15 flight hours or 6 months	Validate FS position is correct.
FT	15 flight hours or 6 months	Perform on-ground test validating FT functionality.