



FLYABILITY  
ELIOS 3

**ORIGINAL  
INSTRUCTIONS**

**VERSION 0.2**  
01.06.2022

# EU DECLARATION OF CONFORMITY

We,

Flyability SA  
EPFL INNOVATION PARK BLDG C, 1014 Lausanne, Switzerland  
Tel: +41 21 311 55 00



declare under our sole responsibility that the product:

ELIOS 3

to which this declaration relates is in conformity with the following standards or other normative documents:

Safety	EN 62368-1:2020
EMC	ETSI EN 301 489-1 V2.2.3 ETSI EN 301 489-17 V3.2.4
Radio	ETSI EN 300 328 V2.2.2
Health (RF Exposure)	EN 62311: 2008 EN 62479: 2010

following the provisions of

- Radio Equipment Directive (RED) 2014/53/EU
- ROHS Directive: 2011/65/EU
- REACH Regulation: 2006/1907/EC

The Technical Construction File is maintained at:

Flyability SA  
EPFL Innovation Park Bldg C, 1014 Lausanne, Switzerland

The authorized representative located within the Community is:

Dr. Adrien Briod  
Chief Technology Officer  
EPFL Innovation Park Bldg C, 1014 Lausanne, Switzerland

A handwritten signature in black ink, appearing to read 'ABriod', is written over the printed name and title of the authorized representative.

Date: June 1<sup>st</sup>, 2022

## FCC COMPLIANCE NOTICE

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This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## FCC RF EXPOSURE INFORMATION

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**(For airplane)** This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20cm during normal operation.

## IC RSS WARNING

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This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

## IC RADIATION EXPOSURE STATEMENT

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**(For airplane)** This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body.

Ce matériel est conforme aux limites de dose d'exposition aux rayonnements, fic rrs-102 énoncée dans un autre environnement. Cette équipement devrait être installé et exploité avec une distance minimale de 20 entre le radiateur et votre corps.

# DISCLAIMER

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Terms with initial capital letters shall have the following meanings:

“Agreement”	means the conditions of use of this Original Instructions and any other agreement between You and Flyability per which the Product has been delivered to You, including but not limited to Flyability's General Terms and Conditions.
“Flyability”	means Flyability SA, a company incorporated in the Canton of Vaud in Switzerland under federal number CH-550.1156.670-6 (IDE CHE-348.376.646) having its registered offices at EPFL Innovation Park BLDG C, 1014 Lausanne, Switzerland
“Product”	means all goods and services described in this document.
“You”	means the person or legal entity to which the Product is delivered or who is operating the aircraft

All rights related to this document and all information it contains are the property of Flyability. REPRODUCTION, USE, OR DISCLOSURE TO THIRD PARTIES WITHOUT PRIOR WRITTEN PERMISSION FROM FLYABILITY IS STRICTLY PROHIBITED.

By using the Products, software and systems of Flyability, You fully accept and consent to, without reservation, Flyability's warranty and liability terms as stated below, and all other terms and conditions agreed between You and Flyability.

## 1. Product limited warranty

By using the Product, You hereby signify that you have read, fully understood, and agreed to this disclaimer and the original instructions, and You agree that the Product:

- (i) Will only be operated by Flyability Certified ELIOS 3 Pilots and, if required by law, with other drone pilot licenses or any other certification necessary to pilot ELIOS 3; and
- (ii) Presents a risk of physical injuries if wrongly used; and
- (iii) Presents a risk of damaging Your and Third-parties' property if wrongly used; and
- (iv) May be unfitted to Your needs and purposes; and
- (v) Is intended to be used by Flyability Certified ELIOS 3 Pilots for industrial and professional purposes only; and
- (vi) Should not be used under the influence of alcohol, drugs, or any substances that may impair cognitive abilities; and
- (vii) Is subject to local regulations that could prevent its use.

You shall pursue all available remedies to You according to the Agreement. The warranty shall exclude defects due to misuse, non-observation of the Original Instructions, moisture or liquids, explosive gas, proximity or exposure to heat at temperatures exceeding the Operating temperature of 50 degrees Celsius, excessive strain, abuse, neglect, misapplication, and repairs or modifications made by anyone other than Flyability or certified by Flyability. There are no express or implied warranties, nor any representations or conditions, other than those stated in this limited warranty and the Agreement. The remedy set forth herein and in the Agreement shall be the sole, exclusive remedy with respect to the Product.

## 2. Product liability

IN NO EVENT OR UNDER ANY CIRCUMSTANCE, UNLESS EXPRESSLY STATED IN THE AGREEMENT, SHALL FLYABILITY SA, ITS DIRECTORS, OFFICERS, OR EMPLOYEES BE LIABLE TO YOU OR TO ANY THIRD PERSON CLAIMING RIGHTS DERIVED FROM YOUR RIGHTS, IN CONTRACT, TORT, OR OTHERWISE, FOR INDIRECT, SPECIAL, INCIDENTAL, EXEMPLARY, PUNITIVE OR CONSEQUENTIAL DAMAGES OF ANY KIND WHATSOEVER, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES INCLUDING, BUT NOT LIMITED TO, ANY DAMAGES CAUSED BY YOU OR A THIRD PARTY WHILE OPERATING OR USING THE PRODUCT, ANY DAMAGES CAUSED BY FAILURE OF THE ELECTRONICS OR SOFTWARE, ANY LOSS OF REVENUE, LOSS OF PROFIT, OR LOSS OF DATA, WHETHER BASED UPON ANY ALLEGED BREACH OF WARRANTY, REPRESENTATION OR CONDITION, CONTRACT, OR ANY OTHER CONDUCT INCLUDING NEGLIGENCE (INTENTIONAL OR OTHERWISE), GIVING RISE TO SUCH CLAIM. A Party who relies on a breach of the other Party's obligations under this Agreement shall take any and all reasonable measures in the circumstances to mitigate the consequences, including loss of profit,

resulting from the breach. If the Party fails to take such measures, the Party in breach may claim a reduction in the damages in the amount by which the consequences should have been mitigated.

YOU SHALL NOT OPERATE THE PRODUCT IN AREAS OR UNDER CIRCUMSTANCES WHERE A FAILURE COULD CAUSE DAMAGE AND/OR HARM TO OBJECTS AND/OR PEOPLE. YOU SHALL READ AND UNDERSTAND THE ORIGINAL INSTRUCTIONS COMPLETELY BEFORE OPERATING THE PRODUCT. ANY DAMAGE AND/OR HARM ARISING FROM NOT ACCURATELY FOLLOWING THE PROCESSES AND GUIDANCE FROM THE ORIGINAL INSTRUCTIONS SHALL BE THE SOLE RESPONSIBILITY OF THE OPERATOR OF THE UAV.

ALL USE OF THE PRODUCT IS UNDER YOUR SOLE RESPONSIBILITY, INCLUDING, BUT NOT LIMITED TO, THE COMPLIANCE WITH APPLICABLE LAW AND REGULATIONS OF THE COUNTRY IN WHICH THE PRODUCT IS OPERATED.

### 3. Data storage and usage

When You use the tablet application or any other software provided by Flyability, data regarding the use and operation of the product, such as flight telemetry data (e.g. battery life, altitude, or hardware identification) and operations records may be automatically or manually uploaded to a Flyability designed server.

The provided data does not include personal data (e.g. name, address) but it does include identification data, such as usernames that may be associated with the UAV. By using the product, the tablet application, or any other software distributed by Flyability, or by manually providing data to Flyability, you consent to:

- (i) Our storage of any telemetry data and other data uploaded or provided to us, which may include your username; and
- (ii) Our use of any such data uploaded or provided (including your username) in connection with providing support and services to You and to improve our products.

#### *Authorizations and regulations*


SOME COUNTRIES MAY HAVE LAWS THAT LIMIT OR PROHIBIT THE USE OF UNMANNED AIRCRAFT. YOU ARE SOLELY RESPONSIBLE FOR SECURING ALL AUTHORIZATIONS, CERTIFICATIONS, AND LICENSES REQUIRED FOR THE USE OF THE PRODUCT. FLYABILITY SA DOES NOT PROVIDE ANY LEGAL ADVICE OR COUNSELING. UNDER NO EVENT SHALL FLYABILITY BE LIABLE FOR ANY INFRINGEMENT OF ANY APPLICABLE LAW BY YOU.

(For remote control)SAR tests are conducted using standard operating positions accepted by the FCC/ISED with the device transmitting at its highest certified power level in all tested frequency bands, although the SAR is determined at the highest certified power level, the actual SAR level of the device while operating can be well below the maximum value. Before a new device is available for sale to the public, it must be tested and certified to the FCC/ISED that it does not exceed the exposure limit established by the FCC/ISED, Tests for each device are performed in positions and locations as required by the FCC/ISED. For body worn operation, this device has been tested and meets the FCC/ISED RF exposure guidelines when used with an accessory designated for this product or when used with an accessory that Contains no metal and that positions the handset a minimum of 1cm from the body. Non - compliance with the above restrictions may result in violation of RF exposure guidelines.

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# 1 Safety



Read carefully and understand these important safety instructions before flying to prevent any risk of accident and/or serious injuries.

## 1.1 Operation Safety Rules

During operation and missions with any Flyability product, please observe the following rules. Make sure people around you have been briefed about safety accordingly.



**WARNING**  
High-speed spinning propeller



**WARNING**  
Loud noise




**WARNING**  
Bright light  
Flashing Light



**WARNING**  
Hot surfaces



**MANDATORY**  
Read the original instructions



**MANDATORY**  
Wear hear protection



**MANDATORY**  
Wear eye protection



**MANDATORY**  
Wear head protection



**MANDATORY**  
Have protective gloves in vicinity

1. Everyone surrounding the operation, including the pilot, must wear eye, ear, and head protection. They must have protective gloves in the vicinity<sup>1</sup>. They should not wear jewelry, loose clothing, or loose/long hair.
2. Apart from the spotter or the inspector, no one should talk to or otherwise distract the pilot while the pilot is operating the drone.
3. Avoid touching the drone while the propellers are spinning. If touching the drone while it is in flight is essential to operations, make sure that the drone is stable and touch only the protective cage with your hands wide open and your fingers straight to prevent any of them from entering the cage. Always wear protective gloves when doing this.
4. Do not fly close to, or directly above, people.
5. Do not look directly into the LEDs, as doing so may lead to eye injuries.
6. In case of an accident, do not try to catch the falling drone. Your safety is more important than the drone.
7. The area around the pilot, as well as the takeoff and landing area, should be free from people and obstacles.

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<sup>1</sup> A risk assessment should be made to state additional protection (e.g. respiratory protection in dusty environments)

## 1.2 General Guidelines

1. The pilot **MUST** be a Flyability Certified ELIOS 3 Pilot and, if required by local laws, hold other drone pilot licenses or any other certification necessary to pilot ELIOS 3.
2. A damaged propeller may break in flight, causing the drone to crash. Pieces of the broken blade can become dangerous projectiles. Replace a propeller if it is broken, cracked, bent, or damaged in any way. Operators and surrounding personnel **MUST** wear safety glasses.
3. A too large gap between the propeller tip and the duct will decrease efficiency and reduce flight time. Replace propellers when the tips are worn down to an extent where the white markings are no longer visible and in any case when there is visible damage or when they have been used for 10 flight hours.
4. Debris can be ejected at high velocity when it collides with the propellers. Operators and surrounding personnel **MUST** wear safety glasses.
5. The pilot should always act according to his or her best judgment, focusing on the safety of the people and the environment in which she or he is flying. The pilot **MUST** brief all personnel attending or surrounding the flight about safety. While piloting, the pilot should not move, as doing so may cause injuries due to slipping, tripping, or falling.
6. **DO NOT** fly over or near people or over or near moving vehicles. When operating outdoors, always give way to other aircraft and watch out for low flying helicopters.
7. Operating the ELIOS 3 system for extended periods of time can be stressful, tiring, and cause muscular fatigue. The controller is equipped with a hook that can connect to a strap. Use the provided controller strap to relieve your muscles. Using the strap will also help the pilot avoid dropping or damaging the ground control station.
8. Using the Flashing LED function on ELIOS 3 can be tiring and stressful to the pilot and surrounding personnel. It may in some cases trigger a seizure in people suffering from epilepsy.
9. The motors contain magnets that can disrupt the proper functioning of medical devices or disturb certain electronic devices located nearby.
10. **DO NOT** use ELIOS 3 under the influence of alcohol, drugs, or any substances that may impair cognitive abilities.
11. A proper risk assessment **MUST** be performed before every flight.
12. The pilot **MUST** always go through the checklists before, during, and after each flight.
13. ELIOS 3, like any remotely piloted aircraft system, must be operated according to the laws of the country and airspace in which it is used. It is the sole responsibility of the pilot to be informed of the applicable restrictions concerning flight near people, buildings, BVLOS (Beyond Visual Line of Sight) operations, or any other special types of operations that may be prohibited or limited by law.
14. Use only parts provided by Flyability, genuine Flyability parts, or parts certified by Flyability. Using other devices or parts in combination with ELIOS 3 (e.g., batteries, propellers, etc.) or performing unauthorized modifications may result in the system malfunctioning and might compromise safety and reliability.
15. Avoid any manual operations inside the drone's cage while the battery is plugged in, except for turning on and off the aircraft.
16. **DO NOT** wear jewelry, loose clothing, or loose/long hair when operating ELIOS 3 or while in its vicinity.
17. Under no circumstance should objects, fingers, or any type of body part enter the drone's protective cage while it is armed (i.e., when the propellers are spinning), since doing so may result in severe personal injuries and damage to the drone.



18. DO NOT perform the arming sequence to arm the drone (i.e., making the propellers spin) during the removal or insertion of the battery, or while objects, fingers, or any other body parts are inside the protective cage.
19. Avoid touching the drone while the propellers are spinning. If touching the drone while it is in flight is essential to operations, make sure that it is stable and touch only the protective cage with your hands wide open and your fingers straight to prevent any of them from entering the cage. Always wear protective gloves when doing this.
20. Propellers have sharp edges. For this reason, protective gloves MUST be worn when changing a propeller.
21. If the drone is unresponsive due to a malfunction, disarm it and DO NOT insert your hands or fingers into the cage until 1 hour after the incident. Wear protective gloves to disconnect the battery.
22. After a strong impact (more than 1m free fall), do not touch the drone as it may explode or catch fire. If the aircraft is in an enclosed place, or near to an explosive or flammable environment, you may carefully place it in a properly ventilated area. The aircraft must remain under supervision for at least 1 hour following a strong impact. A risk assessment should be performed prior to attempting to use the drone again.
23. It is recommended to use only transport cases approved by Flyability to transport the ELIOS 3.
24. Carefully read the Battery Safety Guidelines and the User Manual before using the ELIOS 3 system.
25. During a flight, parts of the aircraft can become very hot. Wait 3 minutes after disarming the drone for these parts to cool down and access the battery. If time is a constraint, you may use protective gloves to change the battery during the cooling period.
26. After a flight, wait 3 minutes before touching the following parts:
  - a. Motors
  - b. Lighting panels
  - c. Lidar assembly, if mounted

## 1.3 Environmental Awareness



Flight in unsafe environmental conditions might lead to accidents or damage to the equipment

1. Do not fly close to people.
2. ELIOS 3 is not waterproof. Do not fly under heavy rain/snow or in very humid environments. Moisture can cause damage to the drone's electronics.
3. Store the ELIOS 3 system in a dry environment that is protected from sunlight and kept between 0°C and 30°C.
4. Mechanical parts may deteriorate more rapidly in dusty, sandy, or corrosive environments. Clean all mechanical parts thoroughly to remove dust after each flight.
5. The propellers may blow harmful dust, vapor, or gasses towards you. Cover this topic in your risk assessment, and if necessary, have yourself and surrounding personnel wear eye protection and respiratory protection.
6. The cage protects the drone from impacts, but small objects can penetrate the cage and cause damage to the drone and its propellers or create high velocity projectiles. In flight, avoid protruding objects and/or any falling objects. In case of doubt about whether such precautions are needed, performing a risk assessment is recommended and eye protection MUST be worn.
7. Flying in low air density environments such as in a combination of high altitude, high temperature, and high humidity, will reduce flight time, control authority and collision resilience. Do not fly at density altitudes over 5000m.
8. The wind may have severe effects on ELIOS 3. With the wind higher than 5m/s when flying in ASSIST mode, Flyability cannot guarantee ELIOS 3's ability to hold its position without pilot input on the sticks . With the wind above 7m/s, Flyability cannot guarantee the stability or flying capability of ELIOS 3.
9. Very cold temperatures lead to reduced flight times. Do not fly in temperatures below 0°C. If you need to fly in an environment below 10°C, heat the batteries to 25°C prior to the flight and observe the safety practices while flying that are described in the Battery Safety Guidelines.
10. Hot temperatures—above 40°C—will interfere with battery performance. The pilot should observe the safe practices regarding the battery described in the Battery Safety Guidelines.
11. Motor performance is automatically reduced to avoid overheating. For this reason, the collision tolerance of the drone cannot be guaranteed above 50°C. Flyability cannot guarantee the drones flight capability and stability if not used in temperatures between 0°C to 50°C.
12. The output power of the lighting system will automatically be reduced in high temperature environments.
13. The electronics and battery are cooled down by the airflow generated by the propellers. Leaving the drone on without flying will eventually make the electronics and sensors overheat and shutdown.
14. After a flight in an environment above 40°C, use gloves for changing the battery or wait for at least 10 minutes for the drone to cool down in a zone where the temperature is below 30°C.
15. It is not recommended to operate the aircraft close to power lines, power transformers, or other areas with high electromagnetic disturbances since these may cause severe effects on the sensors and transmission system, impacting the aircraft's stability and flying capability.

16. The drone is loud. Wearing ear protection is mandatory when flying in enclosed areas or when the aircraft is operating close to personnel.
17. If you are flying in a confined or enclosed place, avoid being inside this same space while the drone is flying. Do not forget this topic in your risk assessment.
18. Avoid flying in a biohazard environment. If this is unavoidable, avoid flying close to people and have yourself and surrounding personnel wear eye protection and respiratory protection as the propellers may blow contaminated particles to you. Also, wear gloves and appropriate protection while manipulating the drone and its equipment until further decontamination. Do not forget this topic in your risk assessment.
19. ELIOS 3 should not be used in or near explosive or flammable environments.

## 1.4 Maintenance guidelines

To ensure safe and reliable maintenance of your ELIOS 3, observe the following preventive actions:

1. Change cage elements whenever they are structurally damaged.
2. A damaged propeller may break, and pieces of the broken blade can become dangerous projectiles and reduce the drone's reliability. Replace a propeller if it is broken, cracked, bent, or damaged in any way, or when the tip is worn down to beyond the tip marking.
3. Re-torque the propeller nuts with the provided 1.4Nm torque screwdriver every 5 flights.
4. Change the propeller after 10 hours of flight.
5. Change the motor after 50 hours of flight when used in a clean environment. Usage in an environment with high levels of dust will significantly reduce the motor life time.

## 2 Checklists

These checklists present proposed workflows to help to operate the ELIOS 3 system in a safe and efficient manner.

### 2.1 Mission Planning Guidelines

This checklist presents the steps that must be followed while planning an operation.

#### 1. Has the Method Statement been filled?

The Method Statement (MS) is a document specifying all the different steps that will be performed during the inspection. The MS also specified all the required equipment needed to fulfill the mission. The "Method Statement—Template" document is provided on our website as a template you can use to create your own Method Statements.

#### 2. Has the Risk Assessment been filled?

The Risk Assessment (RA) is a document specifying all the risks that can occur during the mission. The RA also lists the mitigations that may reduce these risks. The "Risk Assessment—Template" document is provided on our website as a template you can use to create your own Risk Assessments.

#### 3. Is the environment in which the ELIOS 3 will be operated safe?

The flight environment must comply with the limitations presented in the "Environment Awareness" section of the Original Instructions. The presence of dangerous elements must have been stated in the RA and MS documents.

#### 4. Is there any hazard to the pilot?

If the ELIOS 3 is flying in environments that can present bio-hazards or chemical hazards (sewers, pandemic areas, carcinogenic materials, etc.), the risk should be listed within the MS and/or the RA, and appropriate measures must be taken (gloves, eye protection, mask, etc. to address the hazard).

#### 5. Do you have adequate Personal Protective Equipment (PPE)?

The following PPE must always be worn:

- Eye protection.
- Ear protection.
- Hard hat.
- Have protective gloves in vicinity.

You must be aware of the effects of operating ELIOS 3 in your working environment and dress accordingly:

- If the environment is dusty, wear respiratory protection.
- If the environment contains hazardous elements, wear the corresponding PPE.

Mission-specific PPE requirements and/or recommendations must be defined in the MS and/or RA documents.

#### 6. Do you have the proper flight authorization?

If you perform an outdoor flight, depending on the area and on the country in which you will conduct your flight, you might need a specific authorization. Research the airspace in which you plan to fly and contact the aeronautical agency in your country as needed for up-to-date information.

#### 7. Use of the aircraft

Flyability products are NOT listed as dual-use products. Do not use the system with the intent to harm.

## 2.2 Aircraft Inspection

The aircraft inspection checklist ensures that the ELIOS 3 is ready to fly. An inspection that includes all of the items on the checklist should be performed before each flight and after having transported the ELIOS 3. The preflight check is displayed on the tablet before every flight. You may also memorize the mnemonic PEACE to help you remember the Aircraft Inspection Checklist (see below for information on what each letter stands for in the mnemonic).

### **P**ROPELLERS

### TIGHT

Propellers are tight on the motors. Use the 1.4Nm torque screwdriver issued in the toolbox to retighten the nuts.

### **E**LECTRICAL MOTORS

### MOVE FREELY

Check whether the motors rotate freely to make sure that no dust, sand, or other particles are inside them.

### **A**IRCRAFT

### CLEAR OF DAMAGE

Visually inspect the aircraft to make sure it is undamaged. Pay particular attention to carbon parts, propellers, payloads, and LED panels.

### **C**AMERA LENS AND SENSORS

### CLEAN

Clean the camera lens and the sensors using the lens cleaner. Cleaning the lens and sensors will ensure better image quality and better stability for the drone. Check the camera lens for fog or condensation. If an additional payload with a sensor is mounted, make sure it is clean. (lidar payload for example)

### **E**LECTRICAL SUPPLY

### UNDAMAGED | SECURED

The battery is fully charged, visually in proper condition, and secured with the locking mechanism.

## 2.3 Take-off Checklist

Perform the take-off checklist before each flight. Memorize the mnemonic **SAFE** to help you remember the Take-off Checklist ( see below for information on what each letter stands for in the mnemonic).

### **S**AFETY BRIEFING

### PERFORMED

All personnel surrounding the operation have been briefed about safety using the Basic Safety Rules and are aware that they should avoid distracting the pilot.

### **A**IRCRAFT

### CHECKED

The preflight inspection ensures the ELIOS 3 is ready to fly.

### **F**LIGHT PLAN

### DONE

The flight plan ensures that the pilot will fly ELIOS 3 in a safe way and will gather data in a consistent way.

### **E**NVIRONMENT

### CHECKED

Make sure you are flying in a safe environment and complying with the limitations of the drone as stated in the Environmental Awareness section.

## 3 ELIOS 3 System specifications

### AIRCRAFT

CONFIGURATION	Ducted fan quadcopter
DATA INTERFACE	USB-c port using Inspector (requires drone to be powered by its battery)
USER INTERFACE	One back-lit power button with RGB lights to put the drone in different states without using the remote controller
DIMENSIONS	480mm wide (18.9 in) 380mm high (13.8 in)
PROPELLERS	4 propellers, 127mm (5 inches)
TAKEOFF WEIGHT	Base model ~1900 g (< 4.2 lbs) With Lidar payload ~ 2350 g (< 5.2 lbs)
MAX FLIGHT TIME	Base model - Up to 12.5 min in ideal conditions with new battery With Lidar payload - Up to 9 min in ideal conditions with new battery
MAX ASCENT / DESCENT SPEED	Assist and Atti mode: 1.3 m/s (4.3 ft/s) Assist-Sport mode: 2 m/s (6.6ft/s)
MAX SPEED	Assist mode: 1.5 m/s (4.9 ft/s) Assist-Sport mode: 2 m/s (6.6ft/s) Atti mode: 5 m/s (16.4 ft/s) Sport mode: 7 m/s (23 ft/s)
MAX WIND RESISTANCE	5 m/s (Assist mode); 16.4 ft/s 7 m/s (Sport mode); 23 ft/s
MAX OPERATING ALTITUDE	5000m (density altitude)
FLIGHT CONTROL SENSORS	IMU, magnetometer, barometer, 3 computer vision cameras and ToF distance sensor
MATERIALS	Carbon fiber - kevlar composites, magnesium alloy, aeronautical grade aluminum, high-quality thermoplastics
OPERATING TEMP.	0 °C to 50 °C <sup>2</sup> (32 °F to 122 °F)
FLIGHT MODES	ASSIST : Assist mode ASSIST-SPORT : Assist-Sport mode ATTI : Attitude mode SPORT : Sport mode
FAIL-SAFE	Auto-landing on signal lost
OPERATING FREQUENCY	2412 – 2462 MHz (UAV to RC)

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<sup>2</sup>Additional precautions must be taken between 0-10°C and 40-50°C. Stability, flight performance, and flight time might be reduced by extreme temperatures.



MAXIMUM TRANSMITTED POWER (EIRP)	2.4 GHz: 29.68 dBm (FCC); ≤20 dBm (CE); ≤10 dBm/MHz (MIC)
INGRESS PROTECTION	E3 with basic inspection payload: Splash and dust resistant, equivalent to at least IP44 Lidar payload: IP68
NOISE LEVEL	83 dB(A) with Lidar payload
ONBOARD COMPUTER	Nvidia Xavier NX onboard computer with custom Linux OS
STANDBY TIME ON FULL BATTERY	5000h or ~7 months
<b>LIDAR PAYLOAD</b>	
LIDAR SENSOR	Ouster OS0-32 beams sensor
<b>SMART BATTERY</b>	
RATED CAPACITY	4350 mAh
NOMINAL VOLTAGE	22.8 V
BATTERY TYPE	LiPo 6S HV Smart Battery: <ul style="list-style-type: none"><li>- LED, button and user interface for SOC monitoring, etc</li><li>- Improved safety during charge cycle (protection for: overcharge, overcurrent, overvoltage, over/under-temperature)</li><li>- Accurate state-of-health and state-of-charge estimation</li><li>- Plug-and-play charging</li><li>- Self-balancing</li><li>- Storage self-discharge</li><li>- Cycle counter</li><li>- Battery ID</li></ul>
SAFETY ALARM	Audible warning when battery voltage is low
ENERGY	99.2 Wh
CHARGING TIME	1 h
BATTERY CHANGE TIME	< 10s by means of plug and play battery mechanism
COMPLIANCE	Approved for carry-on luggage. Complies with IATA Dangerous Good Regulations
NET WEIGHT	620 g ; 1.4 lbs
OPERATING TEMPERATURE	10°C -40°C (50°F - 104°F) additional precautions must be taken between 0-10°C. Stability, flight performance and flight time might be reduced.
CHARGING TEMPERATURE	0 - 45°C ; 32°F - 113°F
MAX CHARGING POWER	150W AC power
CHARGER	Elios 3 Smart Battery Charger
BATTERY SHELF TIME	250 days when stored at ~20°C and at 50% SOC
BATTERY LIFE TIME	50 flights



**PAYLOAD CHASSIS**

PAYLOAD HEAD	Damped for vibrations
CAMERA POD UPWARD TILT	+90 degrees
CAMERA POD DOWNWARD TILT	-90 degrees
PAYLOAD PROTECTION	Frontal shock absorbers.

**MAIN CAMERA**

SENSOR	1/2.3" CMOS Effective Pixels: 12.3 M Sensitivity: Optimized for low light performance
PHOTO FORMATS	JPG
VIDEO FORMATS	MOV
VIDEO RECORDING RESOLUTIONS	4k Ultra HD: 3840 x 2160 at 30 fps FHD: 1920 x 1080 at 30 fps
VIDEO STREAMING RESOLUTION	FHD: 1920 x 1080 at 30 fps
PHOTO RECORDING RESOLUTION	4000 x 3000, up to 40 pictures
MOVIE FOV	114° horizontal, 131° diagonal
PHOTO FOV	119° horizontal, 149° diagonal
TOTAL VERTICAL FOV	approximately 260° including camera tilt
LENS	2.71 mm focal length Fixed focal
CONTROL MODES	Auto mode with manual EV compensation
FILE STORAGE	128 GB MicroSD card (onboard the aircraft)
SUPPORTED FILE SYSTEM	exFAT

### THERMAL CAMERA

SENSOR	Lepton 3.5 FLIR
VIDEO RECORDING RESOLUTION	160 x 120 at 9 fps
LENS	FOV 56° x 42°, Depth of field 15cm to infinity
SENSITIVITY (NEDT)	<50 mK
TEMPERATURE RANGE	-10°C to 140°C (14°F to 284°F)
WAVELENGTH (LWIR)	8-14 $\mu$ m

### LIGHTING SYSTEM

TYPE	High-efficiency LEDs for even lighting in front, top and bottom, optimized for low impact of dust on picture quality.
CONTROL	From the remote controller, adaptive light beam controlled by camera pitch
MODES	Normal mode (4x panels used) Dustproof lighting (2x outer panels used only) Selective/oblique lighting (left or right side only)
LIGHT OUTPUT	Designed for 16k lumens

### OPERATION SAFETY AND CRASHWORTHINESS

NAVIGATION LIGHTS	One RGB navigation light on the rear of the drone
PROTECTION CAGE	Carbon fiber cage with soft coating, modular subcomponents for maintenance ease, and thermoplastic elastomer suspensions.
COLLISION TOLERANCE	Tolerant to full stick collisions in SPORT-ASSIST on flat walls with lidar payload installed. (<2m/s)
BATTERY LATCH SAFETY SYSTEM	Sensor embedded in battery mechanism to alarm customer with visual warning on drone and in Cockpit if battery lever is not closed correctly.
FAIL SAFE	AUTO-landing on signal list

### REMOTE CONTROLLER

OPERATING FREQUENCIES	2412 – 2462 MHz (RC to UAV)
MAX TRANSMISSION DISTANCE	Up to 500 m in direct line of sight in ideal RF conditions
MAXIMUM TRANSMITTED POWER (EIRP)	2.4 GHz: 29.68 dBm (FCC); $\leq$ 20 dBm (CE); $\leq$ 10 dBm/MHz (MIC)

WEIGHT	1760 g with tablet holder
OPERATING TEMP.	-10°C to 45°C
OUTPUT PORT	USB-c
BATTERY	6700 mAh 1S
CONTROLS	Aircraft control and payload settings
BATTERY CHARGER	12 V / 24 W
BATTERY CHARGING TIME	<2h30min for 0-80% at room temperature <4h for 0-100% at room temperature
BATTERY CHARGING TEMPERATURE RANGE	10°C to 35°C
BATTERY LIFE TIME	300 cycles
OPERATING TIME ON FULL BATTERY	>5h at room temperature

#### TABLET

MODEL	Samsung Galaxy Tab S7 or S8
BATTERY CHARGER	USB 5V
OPERATING TEMP.	-10 °C to 50 °C
CHARGING TEMP.	0 °C to 40 °C
CHARGING TIME	5 hours
WEIGHT	500 g

#### TRANSPORT CASE

DIMENSIONS	65 x 45 x 55 cm
WEIGHT	13 kg

#### COCKPIT SOFTWARE

FEATURES	Real-time video and UAV telemetry, status visualization (remaining battery, payload settings, warnings, etc. ), control payload settings, and various configurations.
COMPATIBILITY	Not compatible with E1 and E2 drones
OPERATING SYSTEM	Android 12, developed for Samsung Tab S7

## INSPECTOR SOFTWARE

FEATURES	Video viewer (frame by frame), flight log analysis including point of interests recorded during flight, screenshots and 2D measurements.  One-button lidar data export to Geoslam if licensed  Dense point cloud import for data localization
OPERATING SYSTEM	Windows 10/11 (64 bits)

# ELIOS 3 System transmitted Power

ELIOS 3 and GCS	
FREQUENCY BAND TX	2.4GHz ISM band (2412MHz - 2462MHz)
CHANNEL BANDWIDTH	20MHz
MAXIMUM TRANSMITTED POWER (EIRP)	2.4 GHz: 29.68 dBm (FCC); ≤20 dBm (CE); ≤10 dBm/MHz (MIC)
DESIGNATION OF EMISSIONS	Downlink: max 18Mbps -> Video: 1080p@30fps -> FMU data Uplink: max 3Mbps -> RC commands
TECHNOLOGY	OFDM, wideband
MODULATION TYPE	OFDM
RADIO LINK ENCRYPTION	128 bit aes-ctr as per the LTE spec

Content subject to change  
To download the latest version check [www.flyability.com](http://www.flyability.com)