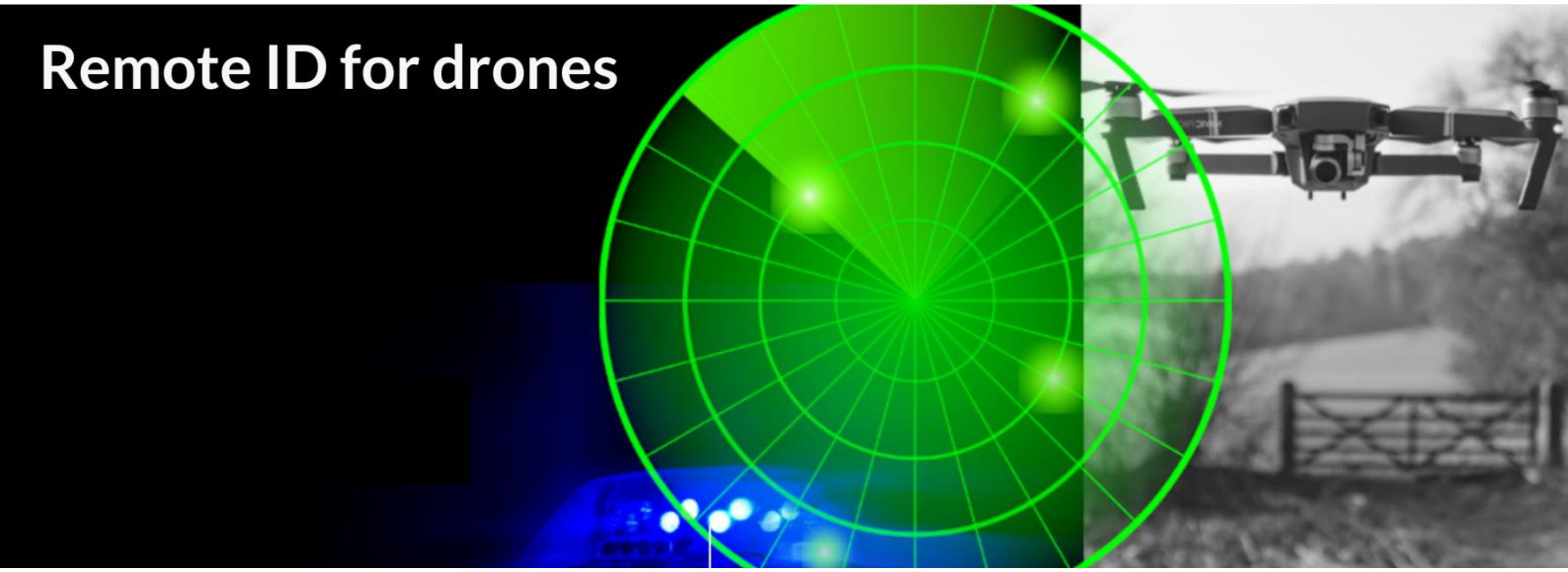
DroneBeacon - Transponder Manual 120-series

December 2022 - version 1.0



The latest version of this manual is located here:
https://download.bluemark.io/db120.pdf

Intended audience: users of the transponder

Disclaimer: we are not responsible or liable for errors or incomplete information in this document.

Version history

version	date	description
1.0	December 2022	● Initial release

QUICK START

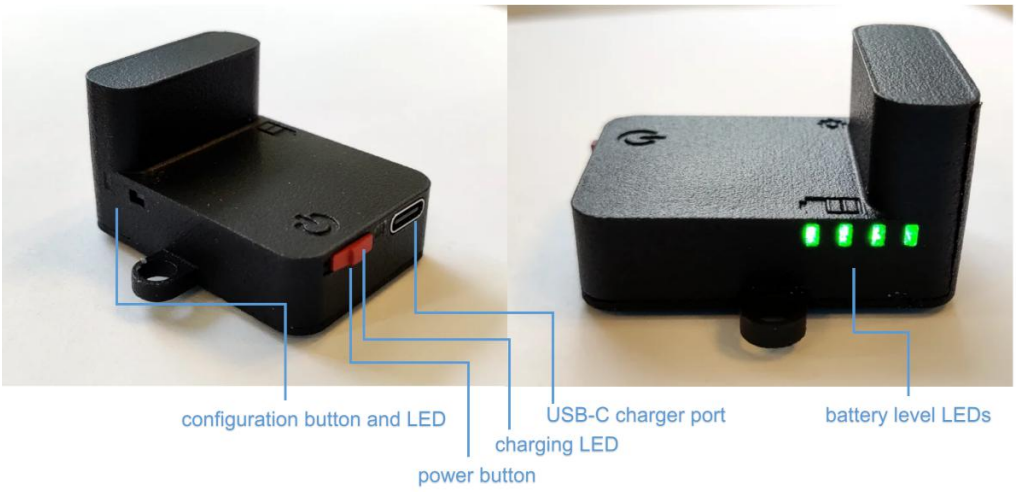
1. Charge the DroneBeacon db120 transponder fully using a USB-C charger.

2. *Optional step:* Configure the DroneBeacon transponder
   a) Move the on-off power switch to *on* (to power up the transponder).
   b) Press the configuration button, the *red* configuration LED is turned on.
   c) Connect to the *dronebeacon* WLAN network (no password needed)
   d) Point your browser to http://192.168.50.1 to configure the transponder.
   e) Press the configuration button again to exit configuration mode

3. Attach the DroneBeacon db120 transponder on the top of your drone for best performance.
   a) Using the 3M dual lock stickers (included)
   b) Using two M5 screws

4. Move the on-off power switch to *on* to power up the transponder.

   The *green* battery LEDs (4) will be turned on. If the transponder has a GPS lock (< 35 seconds outdoor), those battery LEDS will slowly flash. The battery LEDs indicate the battery level. Each LED indicates 25% capacity. If one LED is turned on, the battery level is less than 25% capacity. Two LEDs means between 25 and 50%. If the region is set to the USA, the status LEDs will only flash if there is a GPS fix, the internal self checks are okay and a transmission mode is selected that is compliant with the FAA (WiFi Beacon or BLE dual mode).



Flying a drone could create risks for people, air traffic and other assets. Before flying, the drone operator has to make sure to know the local rules regarding drone flights and obtain the necessary authorization to fly the drone(s).

Contents

1 INTRODUCTION

Thank you for purchasing and using DroneBeacon products!

The latest version of this user manual may be downloaded at the following link, where the most up-to-date version will be found:
https://download.bluemark.io/db120.pdf

(Direct/Broadcast) Remote Identification (Remote ID) adds "beacon" capability to drones to broadcast basic information of airborne drones, such as the operator's registration number, drone serial number and current position. The EU and USA are planning new rules that make Remote ID mandatory for drones over 250 grams weight. The beacon information can be used by general public, law enforcement and drones to give better situation awareness of the airspace around them.

BlueMark Innovations BV offers Remote ID transponders and receivers. DroneBeacon is an add-on (transponder) for drones which broadcasts Remote ID beacon signals. DroneScout is a receiver that detects Remote ID signals of nearby drones up to several km distance (in open space). See https://dronescout.co for more information about our products.

1.1 Audience

This document is intended for users that want to use the *DroneBeacon db120* transponder as a stand-alone Remote ID add-on for their drone or other UAV product. There is a separate manual for the *DroneBeacon MAVLink* db200/db201 transponder: intended for drone manufacturers-.

1.2 Specifications

The transponder consists of an embedded system and several radio-interfaces to broadcast Remote ID signals.

Key specifications:

- **Compliant with international regulations**
  - EU ASD-STAN DIN EN 4709-002
  - USA ASTM Remote ID Standard ASTM F3411-22a-RID-B/ F3586-22
    - Accepted by the FAA https://uasdoc.faa.gov/listDocs/RID000000058
- Supports **all Remote ID transmission protocols**:
  - BLE legacy
  - BLE long range
  - WLAN NaN 2.4 GHz
  - WLAN Beacon 2.4 GHz
- **Long range** up to 5 km detection range[1]
  - Omni-directional antenna with 0 dBi gain
  - Transmit power: +18 dBm (WLAN and Bluetooth)
- Battery life: > 3 hours[2]

[1] The detection range depends on several factors such as the receiver antenna gain, transmission protocol, weather conditions, flying height, receiver height line of sight etc. With professional receivers a range up to 5 km is possible. See the DroneScout manual for more details.

[2] The battery life has been measured at room temperature. The battery life will be shorter, if it is used below 10 degrees Celsius. It also depends on other factors like transmission mode and transmission period. WLAN transmission modes have much shorter battery life: > 1 ½ hours.

- LiPo 3.7V 600 mAh
- Suited for outdoor operation:
  - IP43 rating
  - for operation in rainy conditions, the transponder needs to be protected against water.
- Dimensions (l x w x h): 48 x 38 x 28 mm.
  - with screw nodes the dimensions are 48 x 51 x 28 mm
- Operating temperature
  - -5°C to +40°C
- Weight: 25 g

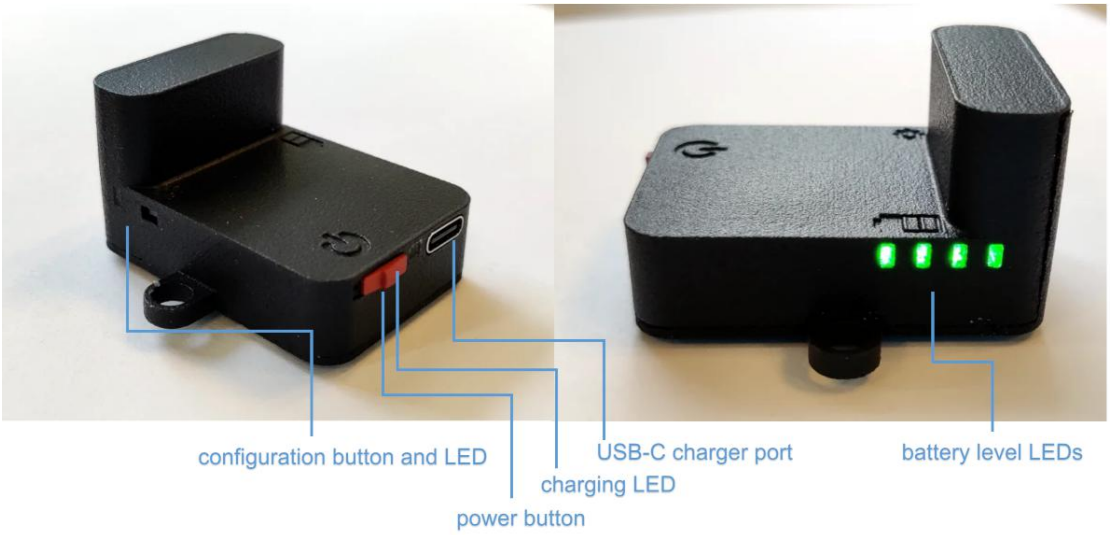


Figure 1 - DroneBeacon 120-serie transponder

1.3 Charging

The transponder can be charged using a standard USB-C charger. It is fully charged within 1 hour. During charging, the charging LED will be *red*. If fully charged, this LED will turn to *green*.

1.4 Installation

Attach the DroneBeacon db120 transponder on the top of your drone for best performance.

semi-permanent/temporarily installation
Use the (included) 3M dual-lock stickers (type 3M SJ4570). One sticker on the bottom of the transponder and the other on the drone where you want to install the transponder.

Note: for a good adhesion/grip, place the dual-lock sticker and apply firm consistent pressure to assure good contact with the substrate you are adhering. Also, it needs 1 hour to 72 hours (preferred) to build a (full) adhesion to the surface. In addition, it is important that the adhesive base for the tape is free of grease and dry, and that it is not covered with a removable lacquer or a layer of paper.

permanent installation
The transponder can be attached to the drone using two M5 screws.
- The distance between the screw noses is 90 mm.
- M5 holes

1.5 Using the transponder

For normal operation:

- Attach the transponder to the drone
- Move the on-off power switch to *on* (to power up the transponder).
- Wait until the transponder has a GPS fix (the *green* battery level LEDs will slowly flash.) This is typically within 35 seconds if the transponder is used outdoor.
- If the region is set to the USA, the status LEDs will only flash if there is a GPS fix, the internal self checks are okay and a transmission mode is selected that is compliant with the FAA (WiFi Beacon or BLE dual mode).

Switch the transponder *off* if you have finished your flight.

Note: make sure the transponder is fully charged.

Flying a drone could create risks for people, air traffic and other assets. Before flying, the drone operator has to make sure to know the local rules regarding drone flights and obtain the necessary authorization to fly the drone(s).

1.6 Android/iOS app

You can use the free *OpenDroneID OSM* Android app to view the DroneBeacon Remote ID signals:
https://play.google.com/store/apps/details?id=org.opendroneid.android_osm

Or the Drone Scanner Android app:
https://play.google.com/store/apps/details?id=cz.dronetag.dronescanner

Note: only few Android smartphones support reception of Bluetooth Long Range and/or WLAN NaN signals. A list of supported smartphones is presented, in the link below.
https://github.com/opendroneid/receiver-android/blob/master/supported-smartphones.md

iOS
The Drone Scanner app is also available for iOS. Due to limitation of iOS only BT4 reception is possible.
https://apps.apple.com/gb/app/drone-scanner/id1644548782

1.7 Open Drone ID

DroneBeacon uses the Open Drone ID framework to broadcast Remote ID signals. The framework can be found on this page: https://www.opendroneid.org/

1.8 LiPo battery

DroneBeacon uses internally a LiPo battery. In general LiPo batteries are safer and more environmentally friendly than other batteries like NiCd and NiMH. While LiPo fires are rare, they can happen incredibly quickly and can do a lot of damage[3]. **Always use a fire proof LiPo safety bag, metal ammo box, or other fire proof container** when you are charging, discharging, or storing DroneBeacon transponders.

[3] https://www.thedronegirl.com/2015/02/07/lipo-battery/

2 CONFIGURATION

The transponder can be configured via a web-interface. To active the configuration mode follow these steps:

- Move the on-off power switch to *on* (to power up the transponder).
- Press the configuration button, the *red* configuration LED is turned on.
- Connect to the *dronebeacon* WLAN network (no password needed)
- Point your browser to http://192.168.50.1

New settings will only be applied if the Save & Apply button is pressed!

Configuration mode will be quit, by pressing the configuration button again. The *red* configuration LED is now turned off. The transponder is now in normal operation mode.

2.1 General

The main configuration can be found on the general tab.

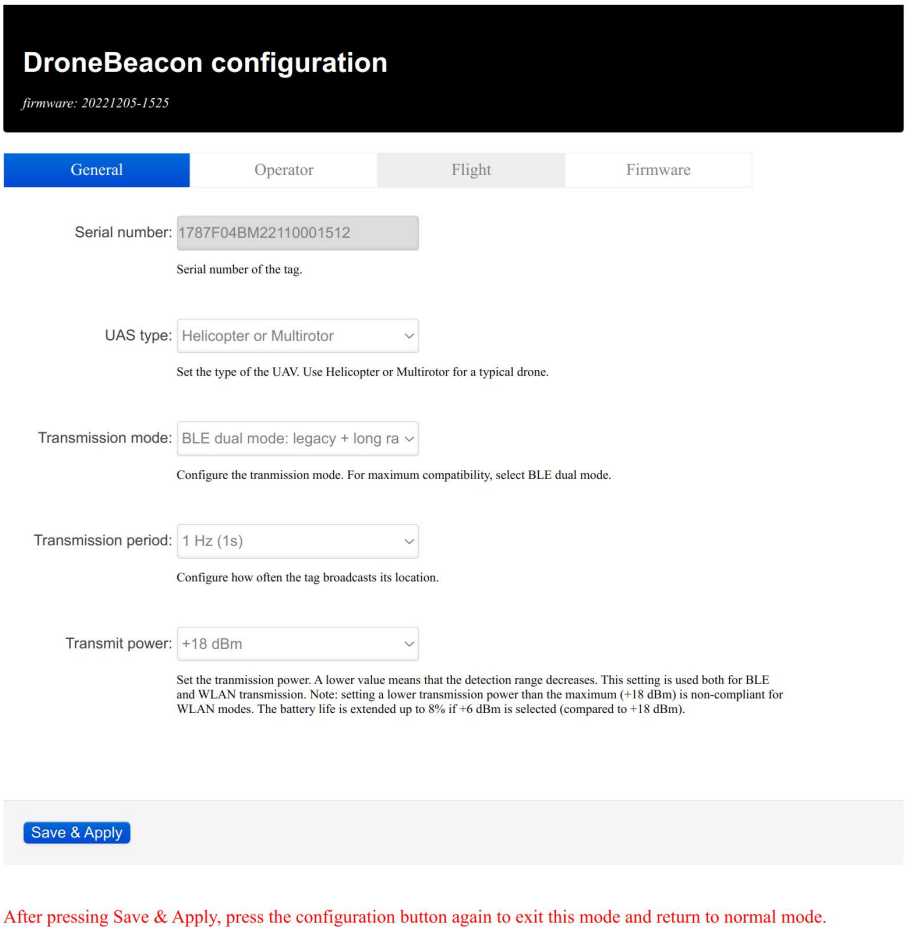


Figure 2 - General configuration page

Fill in the drone type, the transmission mode and transmission period.

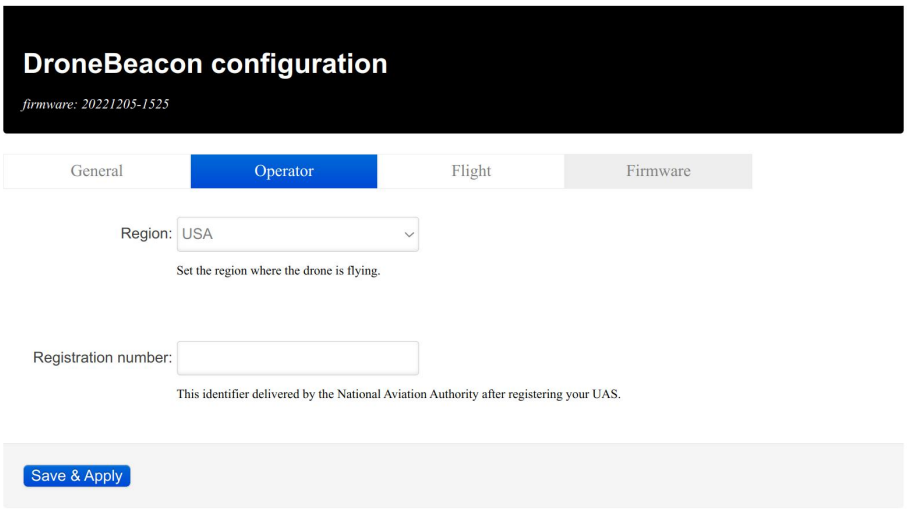
There are seven transmission modes:
- BLE legacy
- BLE long range
- BLE dual mode: legacy + long range
- WLAN NAN
- WLAN Beacon
- WLAN dual mode: NAN + beacon
- All modes: BLE + WLAN

Also, the transmit power can be configured from +6 dBm to +18 dBm. A lower transmit power reduces the detection range and increases the battery life up to 8%.

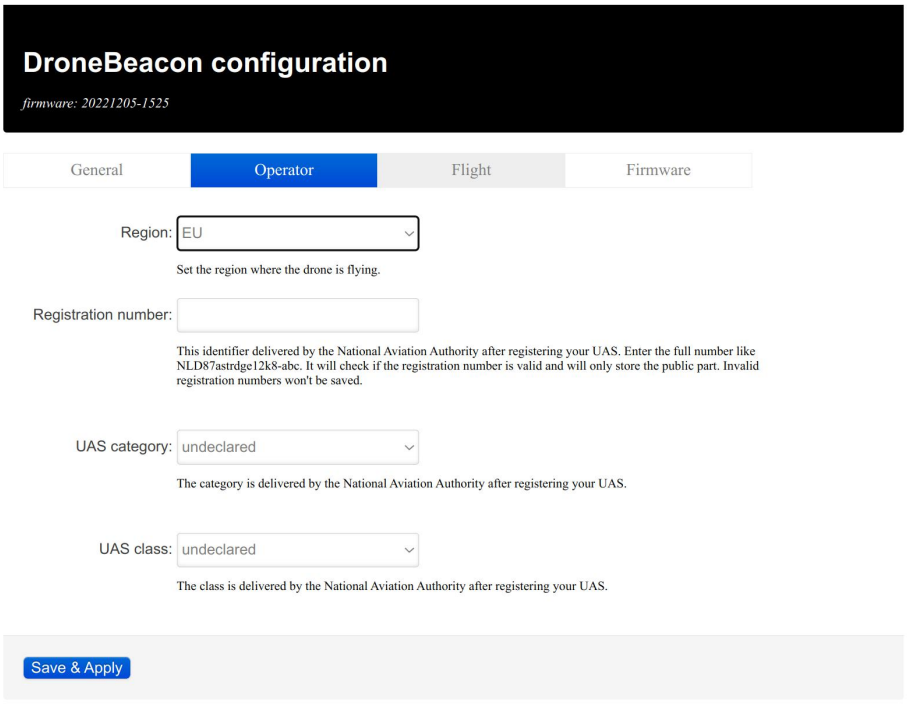
2.2 Operator

In the operator tab, you can configure the details of your license provided by the National Aviation Authority. *First, select the region where the drone is flying*. Outside the EU, no UAS category or UAS class is required.

Within the EU, only valid license numbers can be entered. In that case the input box becomes green.



After pressing Save & Apply, press the configuration button again to exit this mode and return to normal mode.

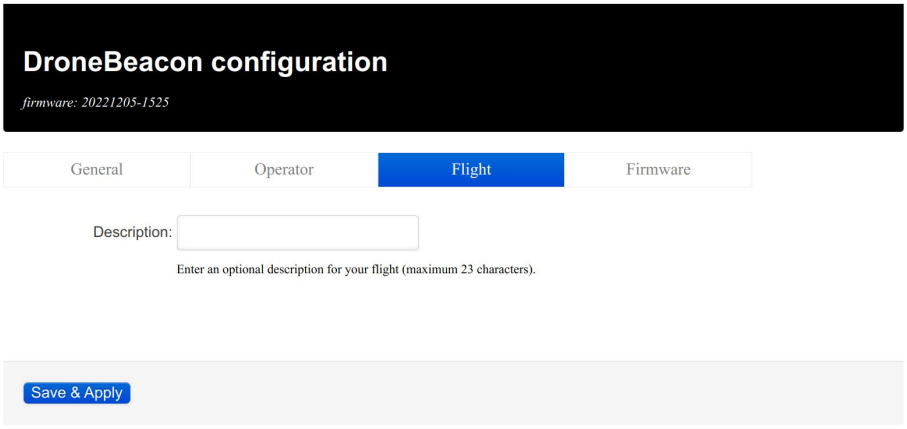


After pressing Save & Apply, press the configuration button again to exit this mode and return to normal mode.

Figure 3 - Operator configuration page

2.3 Flight

In the flight tab, you can configure an *optional* text describing the purpose of your flight.



After pressing Save & Apply, press the configuration button again to exit this mode and return to normal mode.

Figure 4 - Flight configuration page

2.4 Firmware

In the firmware tab, you can upgrade the firmware of the transponder.

Firmware files can be found here: https://dronescout.co/downloads/

Upload the file and press Flash image to upload new firmware. Upgrading firmware has been tested with Chrome and Firefox. If upgrade fails, please try again or try another browser.

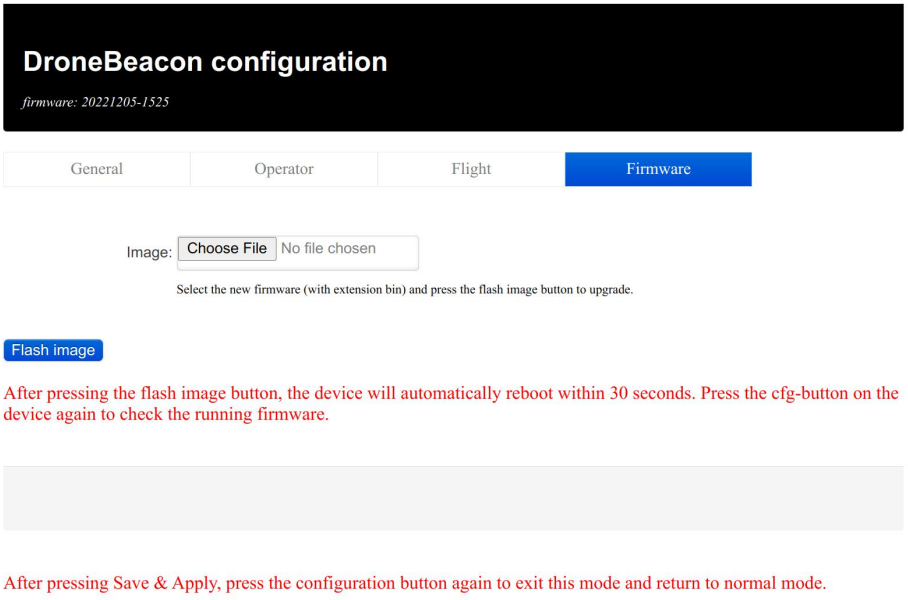


Figure 5 - Firmware upgrade page

3 WARRANTY

The product has a two-year warranty period, starting at the date of receiving the product. Outside warranty are issues like crash damage, improper use, (extreme) weather conditions that damages the product. Also, the battery is excluded from warranty. The product is eligible for future firmware updates as described in the section 2.4 firmware.

4 MORE INFORMATION

If you need more information, please contact us at info@bluemark.io or by phone: +31 53 711 2104.

All contact information can be found at the *DroneScout* contact page:
https://dronescout.co/contact/