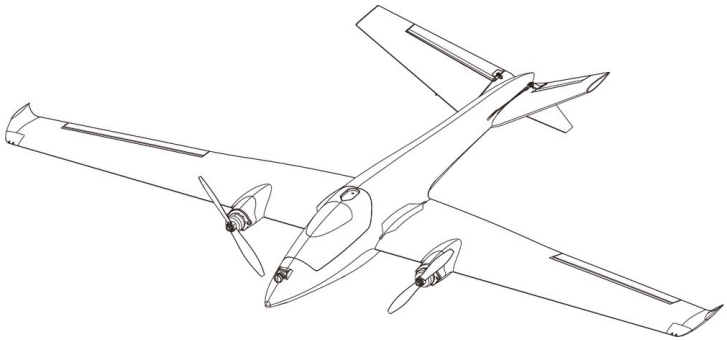
Swordfish RTH

AtomRC · FPV aircraft with 1200 mm wingspan
User manual



Read this entire manual carefully before assembly and the first flight, and keep it for future reference.

www.rotorama.com

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1. Safety instructions

1.1 General rules

- This product is an electrically powered aircraft for experienced users. **It is not a toy** and is not intended for children.
- Spinning propellers can cause serious injury. **Always remove the propellers** when working on the electronics, when connected to a computer and when calibrating the ESCs.
- Never hold the model near the propellers and keep away from them while a battery is connected.
- Fly only in open areas, far from people, animals, buildings, roads and power lines. Observe the regulations given in Chapter 7.
- Do not fly in rain, snow, strong wind or poor visibility, or under the influence of alcohol, drugs or medication that impairs attention.
- Check the model for damage before every flight. Repair or replace damaged parts before the next flight.
- Protect the electronics from moisture. Do not modify the model in any way that would reduce its safety.

1.2 Batteries

The battery is not included. The manufacturer recommends a **4S Li-Po 5000 mAh** battery or a **Li-ion 4S1P pack made of 21700 cells**. The ESCs in the model are rated for **2S–4S** – do not use a battery with more cells, even though the flight controller accepts up to 6S.

Li-Po battery state	per cell	4S battery
Fully charged	4.20 V	16.8 V
End the flight	3.5 V	14.0 V
Storage	3.8 V	15.2 V

- Always install a **fully charged** battery before the flight.
- For a Li-ion pack, follow the voltage limits of the cell manufacturer.
- Charge only with a suitable balance charger, under supervision, on a non-flammable surface and outside the model.
- Do not use a swollen, damaged or overheated battery. Protect the battery from short circuit, impact and high temperature.
- Disconnect the battery after the flight. Never leave the battery in the model unattended.

2. Product description

2.1 Introduction

The Swordfish is a 1200 mm wingspan, middle speed, twin motor glider. The large V-tail improves cruising speed stability, and the aerodynamic shape and low cross-sectional area reduce flight resistance and improve endurance.

Lots of plastic injection parts are used to reduce the weight and size and to improve the strength. The fuselage and the wing are embedded with reinforced carbon tubes to maximize the torsional rigidity of the wing during flight and the structural strength of the tail connection. The belly wheel and the tail skid protect the bottom of the fuselage during landing.

The glider supports the DJI Air Unit as well as analog systems. The take-off weight of 1000 g ± 200 g gives a balanced wing load, a balanced cruise speed and convenient assembly and maintenance.

The **RTH** version comes with the motors, ESCs, servos, flight controller and GPS module already installed. The flight controller is pre-tuned for this model. Just add your own RC receiver and battery, and FPV equipment if needed.

2.2 Specifications

Wingspan	1200 mm
Length	810 mm
Wing area	15.35 dm²
Material	EPP, carbon tube reinforcement
Servos	4× ATOMRC 9g, 300 mm lead
Motors	2× ATOMRC 2306
ESCs	2× ATOMRC Exceed BLS 30A, 2–4S Li-Po
Propellers	7040-2, 4 pcs (7042-2 depending on production batch)
Flight controller (FC)	ATOMRC F405 NAVI
GPS	Beitian BN-220
FC firmware	INAV, pre-tuned; alternatively ArduPilot (ArduPlane)
Recommended take-off weight	1200 g
Recommended battery	4S Li-Po 5000 mAh or Li-ion 4S1P (21700)

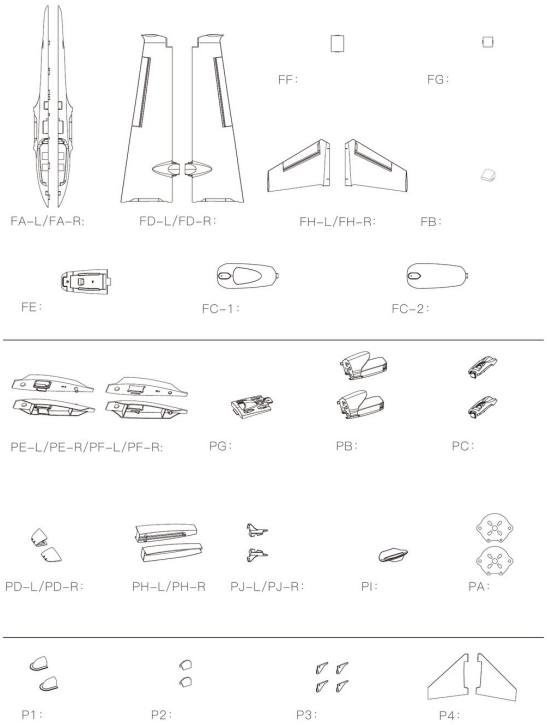
The specs may be slightly adjusted between production batches; the actual product prevails.

2.3 Package contents

- Pre-built kit (airframe with pre-glued parts), wood plate
- Screws and nuts, sticker and user manual
- Quick release connector (Swordfish QRC), flight lights (LED)
- 2× ATOMRC 2306 motor, 2× ATOMRC BLS 30A 2–4S ESC
- 4× ATOMRC 9g servo (300 mm lead), 4× propeller
- ATOMRC F405 NAVI flight controller, BN-220 GPS module

NOT included: RC transmitter and receiver, battery, charger, FPV camera, video transmitter (VTX) and antenna.

2.4 Airframe parts



Airframe parts – see the table for designations

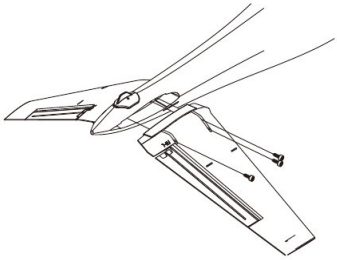
FA-L / FA-R	fuselage	PE / PF (L, R)	wing quick release
FD-L / FD-R	left / right wing	PG	VTX hatch (plastic)
FH-L / FH-R	V-tail	PB	motor mount
FB	camera hatch	PC	ESC hatch
FF	VTX hatch	PD-L / PD-R	flight light cover
FG	GPS hatch	PH-L / PH-R	V-tail base
FE	bottom hatch (equipment bay)	PJ-L / PJ-R	V-tail control horn
FC-1	front hatch 1 (platform)	PI	landing skid
FC-2	front hatch 2 (battery)	PA	motor base
P1	servo cover	P3	control horn
P2	camera mount	P4	wing fence

3. Assembly of the RTH version

In the RTH version, the motors, ESCs, servos, flight controller and GPS are already installed, so some of the following steps are only checks. Keep the **propellers removed** while working on the electronics.

▶ ① Install the V-tail

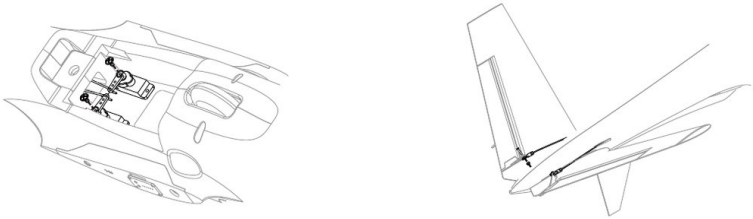
Install the V-tail on the fuselage and fix it with the screws.



Installing the V-tail

▶ ② Push rods

Install the push rods. First fit the Z-bend push rod into the servo arm, then centre the servo and mount the servo arm.



V-tail push rods

▶ ③ INAV Configurator and receiver

Install the INAV Configurator, install the RC receiver in the model, then plug the flight controller to the PC.

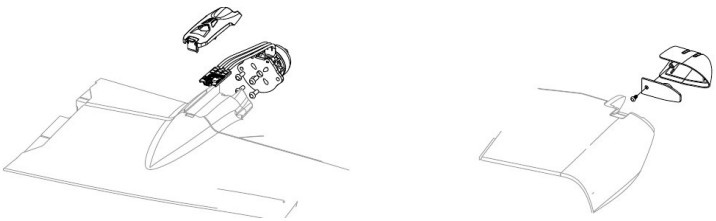
Download: github.com/iNavFlight/inav-configurator/releases

▶ ④ Check the settings

In the INAV Configurator, check the receiver type, then assign the channels and flight mode switches, and check that the servo outputs are correct.

▶ ⑤ Motors, ESCs and LEDs

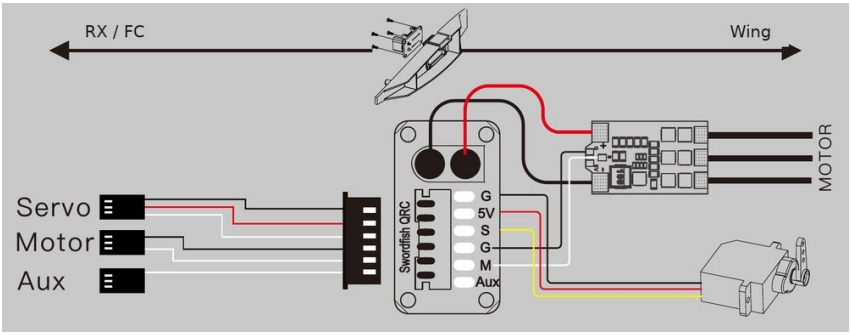
The motors, ESCs and flight lights (LED) are installed on the left and right wing.



Motor, ESC and flight light on the wing

▶ ⑥ Wing quick release wiring

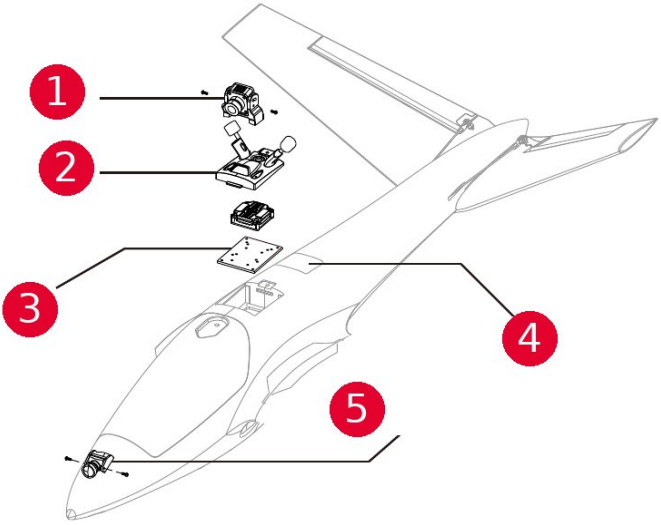
Connect the servo and ESC of the wing to the quick release board (Swordfish QRC) according to the diagram. The *RX / FC* side leads to the receiver or flight controller, the *Wing* side to the wing: *Servo* connector (G, 5V, S), *Motor* (G, M) and *Aux*.



Connecting the servo and ESC to the quick release board

▶ ⑦ FPV equipment (if needed)

Install the camera, VTX system and other peripherals if needed.



① printed camera mount

② VTX hatch

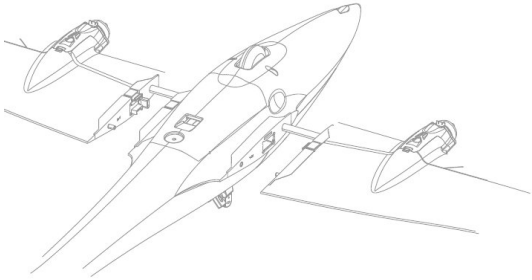
③ wood plate for VTX mounting

④ GPS bay

⑤ front camera mounting position

▶ ⑧ **Install the wing**

Join the left and right wing to the fuselage, carry out the pre-flight tests (Chapter 6.1) and the assembly is complete.



Installing the wing

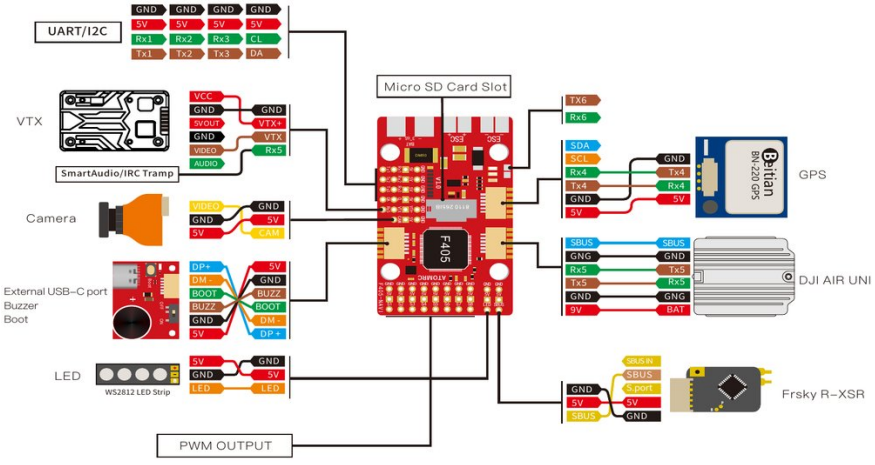
4. ATOMRC F405 NAVI flight controller

4.1 Specifications

MCU	STM32F405RGT6
IMU	BMI270
OSD	AT7456E
Barometer	SPL06-001
UARTs	6
Blackbox	SD card
Input voltage	9–30 V DC (3–6S Li-Po)
Current sensor	120 A
BEC	5 V / 5 A; 9 V / 2 A
Size	50 × 30 × 12 mm
Mounting size	30 × 24 mm, Ø 3 mm
Firmware	INAV: target ATOMRCF405NAVI ArduPilot: target ATOMRCF405NAVI

❊ The ESCs of the Swordfish are rated for 4S maximum. Do not use a higher voltage, even though the flight controller is rated for it.

4.2 Peripheral wiring



Peripheral wiring of the ATOMRC F405 NAVI flight controller

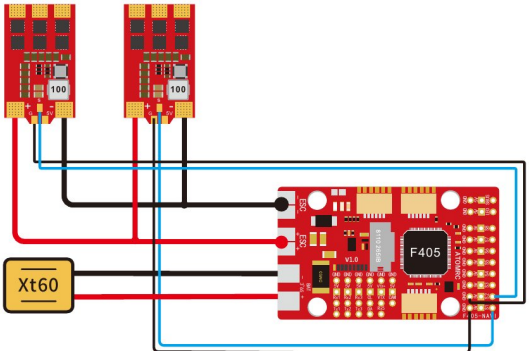
- **BN-220 GPS:** Rx4, Tx4, SDA, SCL, 5V, GND.
- **DJI Air Unit:** Rx5, Tx5, SBUS, 9V, GND.

- **SBUS receiver** (e.g. FrSky R-XSR): SBUS, 5V, GND.
- **Analog VTX:** VTX (video), VTX+ (power), GND; SmartAudio / IRC Tramp control via Rx5.
- **Camera:** CAM (video), 5V, GND. **WS2812 LED strip:** LED, 5V, GND.
- **External USB-C port, buzzer and Boot button** connect to the DP+, DM−, BUZZ and BOOT pads.

※ Rx2 and SBUS cannot be used at the same time – SBUS is on the inverted Rx2. If using a high power setup, we suggest soldering on the capacitor.

4.3 Power supply and ESCs

The battery connects with an XT60 connector to the BAT pads, both ESCs to the ESC pads. The ESC signal wires lead to the flight controller outputs according to the diagram.



Power supply and ESC wiring

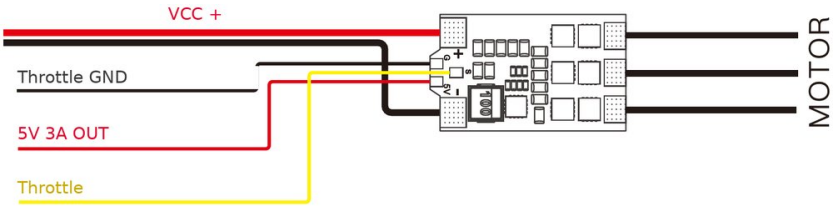


Board dimensions and the 9 V / 5 V VTX voltage bridge

5. ATOMRC Exceed BLS 30A ESC

5.1 Specifications and wiring

Input voltage	2–4S Li-Po
Max current	35 A
BEC	built-in, 5 V / 3 A
Size	29.5 × 17.5 mm



ESC wiring: VCC + (power), Throttle GND (signal ground), 5V 3A OUT (BEC output), Throttle (throttle signal), MOTOR (motor)

5.2 Safe start and throttle calibration

① **Safe start:** the ESC has a safe start. If the battery is connected to the ESC and the throttle stick is not in the low throttle or off position, the motor will not start until the throttle stick is moved to the low throttle or off position.

② **Throttle calibration:** remove the propellers. The ESC must be connected to the motor and receiver. Set the throttle stick to maximum and power on the ESC. The motor will emit a series of beeps; after the beeps, quickly set the throttle stick to the minimum. The motor will emit a series of beeps again and the ESC calibration is done.

6. Before the flight and operation

6.1 Pre-flight check

- Install a **fully charged** battery and secure it against shifting.
- Check that the wings are correctly joined to the fuselage, the quick release connectors are locked and the hatches are screwed down.
- Check the balance of the model – the model must not be tail-heavy. Adjust the battery position as needed.
- Check that the control surfaces move freely and in the correct direction, in both manual and stabilised mode.
- Make sure the propellers are firmly tightened and undamaged.
- Set up the failsafe (signal loss) in INAV so that the model reacts safely, and test it on the ground without propellers.
- Before take-off, wait until the GPS has acquired enough satellites – the return to home functions do not work without it.

6.2 Take-off, flight and landing

The flight controller is pre-tuned and, according to the manufacturer, offers among others auto launch mode, return to home and circle mode. Assign the modes to the transmitter switches in the INAV Configurator.

- Arm (start the motors) only just before take-off; keep the model away from the propellers.
- Launch the model by hand into the wind, with the wings level.
- During the first flights, get familiar with the model in stabilised mode at a sufficient altitude.
- End the flight at the latest when the battery voltage drops to 3.5 V per cell.
- After landing, Disarm (stop the motors) immediately and disconnect the battery.

6.3 After the flight and maintenance

- Check the airframe, motor mounts, push rods and propellers. Replace damaged parts.
- If damaged, EPP can easily be glued with a suitable glue.
- Store the battery at 3.8 V per cell (4S: 15.2 V).
- Store the model in a dry place, away from direct sunlight and heat sources.

7. Operation under aviation regulations

Regulations (EU) 2019/947 and 2019/945 apply in all EU member states, but national implementing rules differ from country to country – registration portals, minimum pilot age, geographical zones, mandatory insurance, permitted frequency bands and maximum transmit power. The information in this chapter describes the situation in the Czech Republic. If you operate the model in another country, you must follow the regulations of the country in which you fly.

- The model is an unmanned aircraft with a maximum take-off mass above 250 g. The operator must **register with the Civil Aviation Authority (ÚCL)** and display the registration number on the model.
- The pilot must complete online training and the test for the A1/A3 subcategories under Regulation (EU) 2019/947.
- The model has no class label (C0–C6). In the open category it can be operated in subcategory **A3** – far from people and at least 150 m from residential, commercial, industrial and recreational areas – or within a model aircraft club or association under Art. 16 of Regulation (EU) 2019/947. Check the classification of your specific operation with the ÚCL.
- The maximum flight height is 120 m above ground and the model must be within visual line of sight (VLOS). When flying with FPV goggles, an observer must stand next to the pilot and watch the model directly.
- Respect geographical zones (airports, protected areas, etc.); the current zone map is published by Air Navigation Services of the Czech Republic (ŘLP ČR).
- We recommend third-party liability insurance for damage caused by operating the model; whether it is mandatory depends on the category of operation.
- The transmitter, receiver and video transmitter you add to the model must comply with the permitted frequencies and power levels in the country of operation; the user is responsible for their settings.

8. Information for the EU and Czech Market

8.1 Importer and responsible person in the EU

The product is placed on the European Union market by the importer stated below, who is at the same time the responsible person within the meaning of Article 16 of Regulation (EU) 2023/988 of the European Parliament and of the Council on general product safety (GPSR).

Importer / responsible person in the EU	Rotorama, s.r.o.
Company ID (IČO)	051 57 692
VAT ID (DIČ)	CZ05157692
Registered office	Okrajová 1351, 674 01 Třebíč, Czech Republic
E-mail	info@rotorama.cz
Phone	+420 252 252 098
Website	www.rotorama.com

8.2 Product conformity

CE

- The product bears the **CE** marking and complies with the requirements of the applicable European Union harmonisation legislation.
- A copy of the **EU Declaration of Conformity** is available from the importer at the address stated above or at the e-mail address info@rotorama.cz.
- **Product identification:** the type designation (AtomRC Swordfish RTH) is stated in this manual and on the proof of purchase; the firmware version of the flight controller is shown by INAV Configurator.

8.3 Disposal of electrical equipment



- The crossed-out wheeled bin symbol on the product, its packaging or in the documentation means that at the end of its service life the product **must not be disposed of together with mixed municipal waste**.
- Hand it over at a take-back point for electrical equipment – at a collection yard, at a take-back point of a collective system, or at the retailer when purchasing a new equivalent product. Take-back is free of charge for the end user.
- The obligations under Act No. 542/2020 Coll., on end-of-life products, are fulfilled by the importer through a collective take-back system.
- Proper disposal helps prevent negative impacts on the environment and human health and contributes to the reuse of secondary raw materials.

Through its contractual partner **ASEKOL a.s.**, the company ensures the take-back of waste electrical equipment from households and the separate collection of waste electrical equipment, batteries and accumulators in accordance with the applicable legislation. The customer is entitled to hand over old electrical equipment or a battery or accumulator at any collection point of the above contractual partner. The addresses of these take-back points are listed at www.asekol.cz, www.ecobat.cz and also https://visoh2.mzp.cz/RegistrMistZO/RegistrMistZOPublic/MapaMistZpetOdberu.

9. Warranty and rights arising from defective performance

Rights of the buyer under Czech law

The rights and obligations of the contracting parties are governed by Czech law, in particular by Act No. 89/2012 Coll., the Civil Code, and Act No. 634/1992 Coll., on consumer protection.

- The seller is liable to the buyer for the product being free of defects on receipt. If the buyer is a consumer, a defect may be notified **within two years of receipt** of the product (Section 2165 of the Civil Code).
- If a defect appears within **one year** of receipt, the product is deemed to have been defective already at the time of receipt (Section 2161(5) of the Civil Code).
- When purchasing online, a consumer has the right to **withdraw from the contract within 14 days** of receiving the goods without giving a reason (Section 1829 of the Civil Code).
- Claims should be made with the retailer from whom you purchased the product. The importer's contact details are given in Chapter 8.1.
- The competent body for out-of-court settlement of consumer disputes is the **Czech Trade Inspection Authority**, Štěpánská 796/44, 110 00 Prague 1, www.coi.cz.