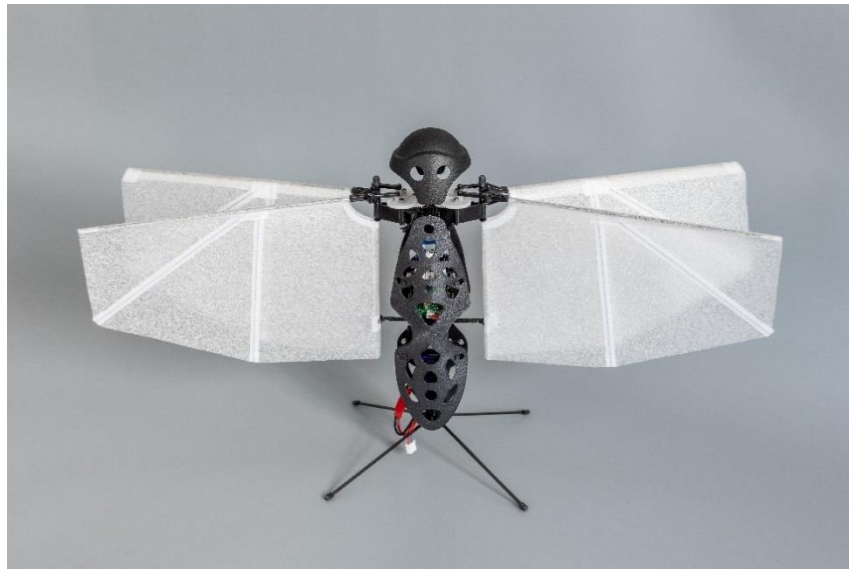


Flapper Nimble+ Starter Kit - Technical Data Sheet

Revision 2023-04 (Early Access)



Introduction

The **Flapper Nimble+** is the world's first commercially available tailless flapping wing robot.

The **Flapper Nimble+ Starter Kit** is a development platform focused on universities, research labs, drone show operators as well as other users who are eager to explore the emerging field of bioinspired aerial robotics.

Features

- Ready to fly kit
 - Attach the wings and fly! No tools required...
 - Hover, fly forward or sideways, turn, climb & descent
- Patented bioinspired wing actuation
 - Brushless drive motors
 - Coreless digital servos with precision metal gears
 - 5-minute battery life when hovering with full payload
 - Up to 20% more in forward flight

- Precise control for fun manual flight
 - Dedicated 2.4 GHz transmitter for precise control
 - Smartphone App (Android/iOS) when packing light
- Crazyflie Bolt flight control board
 - Application microcontroller (STM32F405)
 - Radio & power management microcontroller (nRF51822)
 - 3 axis gyro & 3 axis accelerometer (BMI088)
 - High precision pressure sensor (BMP388)
- Compatible with the Crazyflie ecosystem
 - Open-source firmware
 - Open-source libraries for high-level control
 - Wireless firmware updates
 - Wireless telemetry
- Autonomous flight & addons
 - LPS/Lighthouse and other expansion decks for autonomous flight (sold separately)
 - Integrated onboard logging (uSD) & power measurement
 - Integrated interface for WS2812B RGB LEDs (max 1 A)
 - Integrated interface for optional external receiver (CPPM)
- Customizable appearance
 - Create your own body shells
 - Decorate the wings, or redesign their shape
 - Add light effects with RGB LEDs
- Designed for indoor operation
 - Safety assured by low weight & soft wings
 - Outdoor operation possible at low wind conditions
- Dedicated customer support
 - Online documentation
 - Development support for your specific application
 - All parts available as spares

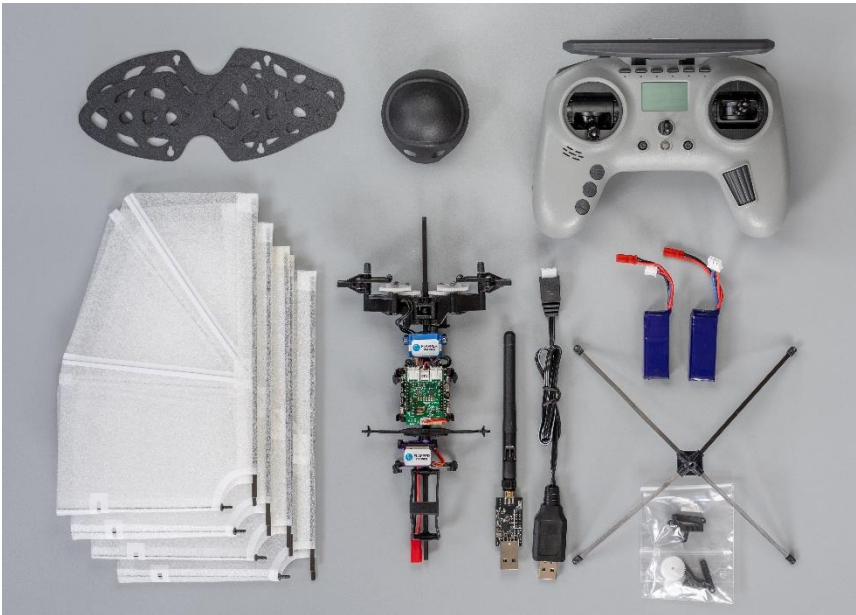
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Technical Specifications	
Wingspan	49 cm
Weight	102 g (min. take-off weight) 114 g (incl. body shells and landing gear)
Max. payload	25 g (body shells, landing gear, add-on sensors, ...)
Battery	LiPo 2S 300 mAh
Actuators	2 x Brushless DC motor 2 x Coreless rotary servo with precision metal gears
Flight time	> 5 minutes (hover with max payload)
Flight Control	Crazyflie Bolt (Bitcraze SE) 2.4 GHz transmitter Mobile App (modern Android & iOS devices)
ESCs	Open-source design by fishpepper.de
Wireless connectivity	nRF51 for Crazyradio PA (PC datalink) BLE (only for Android & iOS App)
Additional Features	Integrated microSD card slot for data logging Compatibility with Crazyflie expansion decks
Expansion Interfaces	Interface for WS2812b RGB LEDs (max 1000 mA) Interface for external receiver (CPPM, 2S) VCC (3.0V, max 100mA), VCOM (5V, max 300mA) I2C (400kHz), SPI, 2 x UART, 4 x GPIO/CS for SPI
Accessories Included (Starter Kit)	1 x 2.4 GHz Transmitter with Open TX/Edge TX 2 x Wing set (1 + 1 spare) 2 x 300mAh 2S LiPo battery (1 + 1 spare) 1 x Landing gear 1 x Body shell set 1 x Wear and tear spares set 1 x Wing repair tape 1 x USB 2S LiPo battery charger 1 x Crazyradio PA USB dongle 1 x Flight case (46 x 33 x 15 cm)
Not Included	USB power adaptor (battery & transmitter charging) USB-A to USB-C cable (transmitter charging) microSD card (onboard data logging)



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Applications

- **Academic Research**
 - Flapping flight dynamics
 - Flight control of bioinspired robots
 - Swarming
- **Education**
 - Introduction to animal flight and bio-inspired robotics
 - High school and University courses
 - Science museums
- **Entertainment**
 - Drone shows
 - Flying characters in theaters & theme parks

