

PRODUCT SPECIFICATION

500 mm UAV Development Platform

500 mm quadrotor airframe kit · ArduPilot / PX4 · GPS-denied capable

A complete powertrain and airframe for autonomy development. Ships with motors, a 4-in-1 ESC, propellers, telemetry and optical-flow sensing — sized for a 500 g class payload with 3.47:1 thrust margin at reference weight. Flight controller, companion computer, mission sensors and battery are chosen by the integrator.

This kit is NOT NDAA Section 848 compliant and is not eligible for federal procurement. No country-of-origin or NDAA declarations are supplied. Intended for commercial, research, and educational use without sourcing restrictions.

Capability Summary

Capability	Provision
GPS-denied flight	MicoAir MTF-01P — PMW3901 optical flow + laser ToF rangefinder, 100 Hz over UART, MAVLink. No GNSS dependency. Indoor and outdoor position hold; requires >60 lux.
Payload capacity	1232 g above a 410 g reference compute and sensing payload, to a 4000 g MTOW.
Companion compute	Mounting provision for Jetson Orin / Raspberry Pi class boards.
Telemetry	MicoAir LR900-F, 500 mW LoRa, 915 MHz band. Air + ground pair included, with antennas and Pixhawk cables. Manufacturer-rated to 30 km line of sight.
Autopilot compatibility	Standard Pixhawk interfaces — Pixhawk 6C/6X, CUAV V5+, Cube Orange+. ArduPilot and PX4 both supported.
Safety	ESC interface supports RC or autopilot-level motor interlock, allowing an independent kill-switch channel alongside autonomous control.
Logging	Autopilot dataflash logging; no additional hardware required.
Supply chain	Commercial. No NDAA declarations. Not eligible for federal procurement.

Typical applications: university and research platforms, autonomy and computer-vision development, indoor inspection, GPS-denied navigation research, and engineering competitions with no sourcing restriction.

Pricing

Kit price: \$1,600

Covers the airframe and powertrain. Flight controller, companion computer, battery, and payload are integrator-supplied (see below).

What's in the Kit

Item	Qty	Vendor
HPR Q500 Frame Kit	1	Hardpoint Robotics
EMAX ECO II 3115 640 KV motor	4	EMAX
HGLRC 60 A 4-in-1 BLHeli_S ESC (2-6S)	1	HGLRC
MicoAir LR900-F 500 mW 915 MHz LoRa pair (air + ground), incl. antennas and JST-GH cables	2	MicoAir Technology
MicoAir MTF-01P (optical flow + laser ToF)	1	MicoAir Technology
Master Airscrew MR 11x4.5 propeller	4	Master Airscrew
Prop adaptor rings, 6→5 mm	4	Master Airscrew
Misc (hardware, wiring, standoffs, straps)	—	—

Not Included – Integrator-Supplied

Item	Est. cost	Notes
Autopilot	\$250	Pixhawk 6C or CUAV V5+. Cube Orange+ (\$451) also fits.
Companion computer	\$250+	Jetson Orin Nano class; mounting provided. Power is integrator-supplied.
6S 5000 mAh LiPo	\$120-200	XT90 connector.
RC transmitter and receiver	\$200+	Manual control and motor-interlock / kill-switch channel.
Mission payload	varies	1232 g of headroom to MTOW for sensors, manipulators, accelerators.
Ground station	varies	Mission Planner or QGroundControl; ground-side LR900-F radio included in the kit.

A complete flying system with autopilot, compute, depth camera, radio and battery lands near \$2,950.

Powertrain Specification

Motor	EMAX ECO II 3115, 640 KV
Motor weight (ea)	112 g incl. lead
Motor dimensions	37.3 × 48.65 mm
Stator	31 × 15 mm, 12N14P
Shaft	5 mm, M5 prop thread
Mount pattern	4 × M3, 19 × 19 mm
Lead	18 AWG, 270 mm
Propeller	Master Airscrew MR Series 11 × 4.5
Propeller weight (ea)	16.8 g
Prop material	GFRC, US-made
Prop hub	6 mm bore, 8 mm hub — needs 6→5 mm adaptor rings (included)
Disk area (4)	0.245 m ²
ESC	HGLRC 60A 6S V1 4-in-1 BLHeli_S (60 A per motor, 2-6S, DShot 150/300/600, M3 mounting)
ESC weight	40 g installed (single 4-in-1 board, leads and heatshrink)
Battery (not included)	6S 5000 mAh LiPo
Hover current	4.6 A per motor at reference weight
Hover throttle	~30%
Thrust ceiling	~2.4 kg/rotor → 9.6 kg total
MTOW	4000 g (frame-limited)
Power path	XT90 to 4-in-1 ESC
Peak bus at 2:1 from MTOW	~86 A (21.6 A per motor)

Weight Budget

Frame (500 mm carbon)	920 g
Powertrain & avionics (motors, ESCs, props, radio, flow sensor)	583 g
Autopilot (Cube Orange+ class)	75 g
Base airframe subtotal	1578 g
Companion computer (Orin Nano class)	175 g
Stereo depth camera (ZED 2i class)	235 g
Mission payload	410 g
6S 5000 mAh LiPo	780 g
AUW, reference payload	2768 g

Performance

Modeled at figure of merit 0.60, electrical efficiency 0.78, 22.2 V nominal, 80% usable pack capacity.

1 • Base weight – airframe and autopilot, no mission payload

Battery	Pack wt	Usable Wh	AUW	Bus	Margin	Endurance
6S 5000 LiPo	780 g	89	2358 g	14 A	4.07:1	17.4 min
6S 6000 LiPo	880 g	107	2458 g	15 A	3.91:1	19.7 min
6S 8000 LiPo	1150 g	142	2728 g	17 A	3.52:1	22.3 min

Base airframe 1578 g – a complete flyable aircraft with autopilot, telemetry and optical-flow sensing, before any mission payload. This is the configuration to tune and trim in first. Autopilot is integrator-supplied.

2 • Reference payload – companion computer and depth camera (410 g)

Battery	Pack wt	Usable Wh	AUW	Bus	Margin	Endurance
6S 5000 LiPo	780 g	89	2768 g	18 A	3.47:1	13.7 min
6S 6000 LiPo	880 g	107	2868 g	19 A	3.35:1	15.6 min
6S 8000 LiPo	1150 g	142	3138 g	21 A	3.06:1	18.1 min

Reference configuration for a typical autonomy build. The 6S 5000 is the recommended default – lowest AUW, best thrust margin, and least downwash for work near the ground or over loose objects. Step up a pack size where mission duration matters more than agility.

3 • At MTOW – 4000 g

Battery	Payload headroom	AUW at MTOW	Bus at MTOW	Endurance
6S 5000 LiPo	1232 g	4000 g	31 A	7.9 min
6S 6000 LiPo	1132 g	4000 g	31 A	9.5 min
6S 8000 LiPo	862 g	4000 g	31 A	12.6 min

Payload headroom is measured above the reference payload configuration. MTOW does not vary with battery or propeller because it is set by the frame, not the powertrain. Margin at MTOW is 2.40:1. Flying near MTOW costs endurance sharply – step up a pack size when running heavy.