



Airineers

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www.rapidonline.com

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Airineers®

in partnership with  AUTODESK.

Airineers is a STEM challenge for secondary school aged students who will need to design, build and learn to fly their own radio-controlled quadcopter, often referred to as a drone.

It was created to provide a cutting-edge design and manufacture project that would allow students to learn CAD skills and apply them to manufacturing techniques such as 3D printing, laser cutting and vacuum forming as well as hand-made prototypes.

Micro Drones are just about the easiest way to learn how to make and fly a radio controlled multirotor. Teams will need to design and build an efficient and manoeuvrable micro-sized flying machine that will compete in team games, individual challenges and time trials. And just in case making your own drone wasn't amazing enough, you'll experience all the action from First Person View or FPV via a tiny camera mounted on the drone itself.



Design using free CAD software

Autodesk are the biggest name in CAD software and have products that are used in engineering, product design, architecture, film, game design and VR. Airineers have worked closely with Autodesk to develop resources for the Fusion 360 and TinkerCAD software to help students learn how to design a drone from scratch, and the best part is that for schools and students, this software is completely free.

Fusion 360

Fusion 360 is professional-grade software that combines computer-aided design, manufacture and engineering (CAD, CAM and CAE) into a single software package. Whilst the software is installed and run locally, Fusion 360 allows users to harness the massive power of Autodesk's cloud computing to speed up rendering and processing of more complex designs.

TinkerCAD

TinkerCAD is a free, easy-to-use browser-based app for 3D design, electronics and coding with a shallow learning curve. Because it is browser-based, there is no software to install and students can access it almost anywhere

Visit www.airineers.co.uk to learn how to access the software.

Design Examples

Airineers Micro Drones can be manufactured using all manner of techniques and materials, each with different advantages. Here are just a few examples.

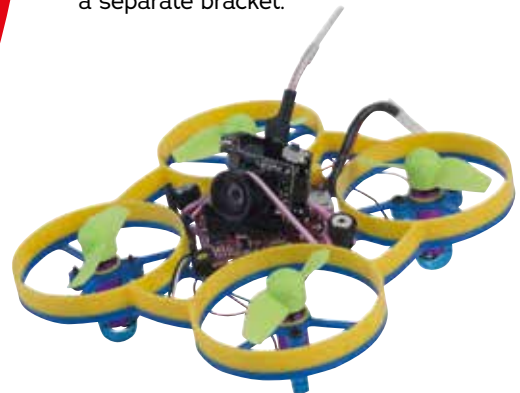
Design Examples

Airineers Micro Drones can be manufactured using all manner of techniques and materials, each with different advantages. Here are just a few examples.



3D printing

Entirely 3D printed using two separate parts. The main frame has the motor mounts, propeller ducts and flight controller mounts. The camera is mounted using a separate bracket.



CNC milling and 3D printing

The main frame is CNC milled from HDPE and 3D printed parts are used to protect the motors and to mount the camera. HDPE has the advantage of being more robust than 3D printing and you could even try making your own HDPE sheet from old plastic milk bottles.

Vacuum forming and 3D printing

The main body and camera mount including the ducts are vacuum formed. A 3D printed part is used for the motor mounts.

Foamboard and 3D printing

The motor mounts are 3D printed but the main frame, propeller ducts and camera mount are hand cut from foamboard. This has the advantage of being quick and easy to make as well as extremely light.





Watch instructional videos at:
www.airineers.co.uk

Tutorials and safety

Video tutorials for every aspect of Airineers Micro Drones can be found at **www.airineers.co.uk**

If you are new to CAD, learn how to use Fusion 360 or TinkerCAD to design your drone frame. Our tutorials also show you how to assemble a Micro Drone, use BetaFlight to configure your flight controller and help you understand the principles behind how a drone flies.

You'll also find a wealth of information regarding the safe use of different types of drones, including Micro Drones



Starter kits

Airineers Starter Kits contain everything you need to build a Micro Drone. The only thing that is not included is the frame as this is designed and manufactured by the students.



Airineers Micro Drone Starter Kit

This kit contains all the electronics, controller and FPV goggles required to build a Micro Class drone for the Airineers competition.

- Kit includes:
- Airineers FS-i6S transmitter
 - Set of 4 propellers
 - Set of 4 motors
 - Flight controller
 - FPV camera and video transmitter
 - 5 drone batteries and charger
 - VR-007pro FPV goggles and battery

Transmitter requires 4xAA batteries, not included

£125.99

Order code
70-1201



Airineers Micro Drone Squadron Set

The Squadron Kit contains all the parts needed to build a Squadron of four Airineers Micro Class Drones, allowing you to design, build and practice flying with four FPV Micro Drones in the air at the same time.

- Kit includes:
- 4x Airineers FS-i6S transmitter
 - 4x set of 4 propellers
 - 4x set of 4 motors
 - 4x Flight controller
 - 4x FPV camera and video transmitter
 - 15 drone batteries and suitable chargers
 - 4x VR-007pro FPV goggles and batteries

Transmitter requires 4xAA batteries, not included

£459.99

Order code
70-1202



Airgeers FPV Micro-Drone Component Kit

£52.49

Order code 70-1200

Includes:

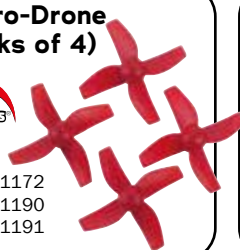
- Flight controller • FPV camera and transmitter
- 4 motors • 5 batteries and charger



Airgeers Micro-Drone Propellers (packs of 4)

£1.58

- Red** Order code 70-1172
- Blue** Order code 70-1190
- Green** Order code 70-1191



Airgeers Micro-Drone FlySky Compatible Flight Controller

£20.99

Order code 70-1173



Airgeers Micro-Drone Motors 59,000RPM

CW MOTOR

CCW MOTOR

£2.63 £2.63

Order code 70-1175

Order code 70-1192



Airgeers Micro-Drone Upgrade Motors 67,000RPM

CW MOTOR

CCW MOTOR

£3.25 £3.25

Order code 70-1194

Order code 70-1193



Airgeers Micro-Drone FPV Camera and Transmitter

£11.54

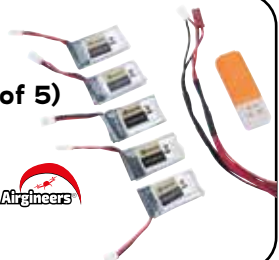
Order code 70-1174



Airgeers Micro-Drone Batteries (set of 5) and charger

£15.74

Order code 70-1176



Airgeers EO10 RC Quadcopter Spares Part Frame

£1.98

Order code 70-1080



Reely LiPo Battery Safety Bag

REELY

£10.76

Order code 70-1178



Airgeers FS-i6S Transmitter with FS-A8S Receiver



£44.95

Order code 70-1160



Airgeers VR-007 FPV Goggles



£41.99

Order code 70-1177



Airgeers VRO07 Pro 3.7V 1600mAh LiPO Battery



£6.29

Order code 70-1079



UP mini 2 ES

Based on the original UP mini 2, the UP mini 2 ES 3D printer offers the same benefits that made its predecessor a best-seller, including HEPA filtration, Wi-Fi, and extensive materials compatibility. Its enclosure provides an outstanding anti-warping environment for ABS and other high-temperature printing while allowing for a wide range of filaments, from PLA to polycarbonate.

The new version has easier to remove supports, an improved touch screen and allows you to print directly from a USB stick.

- 120 x 120 x 120 build volume
- 0.15mm layer thickness for high resolution prints
- Automatic nozzle height detection
- Heated bed
- Fully enclosed design with HEPA filter
- Print from computer using USB, LAN or WiFi
- Print direct from USB stick
- Includes tools and 500g spool of filament

£569.00

Order code 25-0234



Ideal for micro drone parts

The UP mini 2 is a fully enclosed designs with integrated HEPA filters which are strongly recommended for use in a classroom environment.

Motor Accessories



All-In Starter Kit



This kit is the perfect place to begin your Airgeineers journey because it contains everything you need to build both Micro and a 3S Class drones.

The Tyrant-S 3S Class kit contains all of the components and the frame required to build a fully functioning racing drone. Some soldering and basic tools are required to complete assembly.

The Micro Class kit contains all of the electronics needed to make an FPV micro-drone. However, this kit does not come with a chassis – your students will need to design and manufacture one using 3D printing, laser cutting or other techniques. CAD files for a basic chassis are available to download from www.airgeineers.co.uk.

Kit includes:

- FlySky FS-i6S transmitter
- VR-007pro FPV goggles
- Tyrant-S 3S Class FPV racing drone kit
- Micro Class racing drone kit
- Batteries and chargers

Transmitter requires 4x AA batteries, not included.

Type	Order code	1+
All-in starter kit	70-1204	314.99

565846



Tyrant-S 3S Class FPV Starter Kit



If you need a complete set-up for an Airgeineers 3S Class racing drone, this is the kit for you.

The Tyrant-S 3S Class FPV starter kit contains all of the components and the frame required to build a fully functioning racing drone. The kit also includes FPV goggles, batteries and chargers.

Some soldering and basic tools are required to complete assembly.

Kit includes:

- FlySky FS-i6S transmitter
- Tyrant-S 3S class FPV racing drone kit
- VR-007pro FPV goggles
- Batteries and chargers

Transmitter requires 4x AA batteries, not included.

Type	Order code	1+
Tyrant-S starter kit	70-1203	272.99

565845



Tyrant S Racing Drone



A racing drone needs to be fast, agile and seriously robust – all features that the Tyrant-S has in spades.

The 4mm thick carbon-fibre frame is as tough as they come and the 2205 motors and 30A ESCs mean that power comes in abundance. But power is nothing without control which is why the Tyrant-S uses the latest FC-Fury F3 flight controller to ensure an incredible responsive flight whilst still allowing varying degrees of self-levelling to help new pilots learn to fly.

We recommend this kit version for use in the **Airgeineers competition**. This allows students to learn how the drone is built so that in the event of a really big crash, they can fix it themselves!

Features:

- Unassembled kit version, ideal for learning
- Robust 4mm thick carbon-fibre frame
- High-power 2205 motors
- 30A Electronic Speed Controllers
- FC-Fury F3 highly configurable flight controller
- 800TVL FPV camera
- 40-channel FPV video transmitter
- 5045 3-blade propellers
- Mounting plate for GoPro or other similar HD action camera

Requires a transmitter, receiver, battery and charger (not included) to get into the air.

Type	Order code	1+
Unassembled	70-1162	109.95

565788



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STEM to life

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Tyrant S Replacement Frame Kit



Don't fear! If the worst should happen and you have a really big crash that breaks the frame, replacements are available.

This kit is a complete replacement frame with all fixings and hardware required to put it together.

Type	Order code	1+
Replacement frame kit	70-1163	31.23

565790



5045 3-Blade Propellers Set of 4

These propellers have the same specification as the ones supplied with the Airgeineers Tyrant-S racing drone.

They come as a complete set with two clockwise and two counter-clockwise propellers. It's always worth keeping a couple of packs handy in case you break a blade when flying.

Features:

- 127mm (5in.) diameter
- 114.3mm (4.5in.) pitch
- 3 blades
- Pack contains 2x CW and 2x CCW propellers

When changing propellers, be sure to fit the clockwise and counter-clockwise propellers to the correct motors!

Type	Order code	1+
3-blade propellers	70-1170	0.86

565791



Diatone Fury F3S Flight Controller

The **Diatone Fury F3S**

is a BetaFlight-based flight controller with integrated on-screen display designed for use with FPV drones. It can be configured using BetaFlight and other similar configurators and features integrated PDB and on-screen display (OSD). Each flight controller is supplied with rubber mounting bushes to allow it to be "soft-mounted".

This is the same as the flight controller supplied with later versions of the **Diatone Tyrant-S** kit but it is also backwardly compatible with earlier versions of the kit that were supplied with the Fury-F3.

The F3S has an integrated PDB which can supply up to 35A to each of the four ESC ports and a 5V BEC rated at 1.5A.



- Processor: STM32 F303
- Motion sensor: MPU6000
- OSD chip: AT7456
- BEC: 5V 1.5A (2A burst)
- Input: 3-5S LiPo (11.1V - 21V)
- Max current: 140A (4x 35A)
- Mounting: 30.5mm pitch
- Dimensions: 44x 40x 6.6mm
- Weight: 10g

Type	Order code	1+
F3S	70-1197	16.90

567236

DIATONE INNOVATIONS

M2205 2300KV Motor

These high-power brushless motors are identical to the ones used on the Airgeeners Tyrant-S racing drone but are ideal for use on any number of drone projects.



Type	Order code	1+
M2205 2300KV motor	70-1166	4.82

565793

DIATONE INNOVATIONS

302XD ESC Electronic Speed Controller

A replacement ESC (Electronic Speed Controller), as used on the Airgeeners Tyrant-S racing drone.

The ESC is based on the Silabs EFM8BB21 (BB2) with the latest version of Biheli_S firmware.

Features:

- 3-4S LiPo input
- 30A continuous current
- 60A burst current
- Supports oneshot125, oneshot42, Multishot and Dshot600 protocols
- Weight 5g
- **Diatone type 302XD**



Type	Order code	1+
Speed controller	70-1165	6.93

565792

DIATONE INNOVATIONS

800TVL FPV (First Person View) Camera

These miniature cameras are ideal for use in FPV (first person view) applications on drones or any other radio controlled model.

They are the same as the camera used on the Airgeeners Tyrant-S racing drone, so are an ideal replacement if the original gets damaged.



Type	Order code	1+
800TVL FPV camera	70-1167	7.53

565794

DIATONE INNOVATIONS

Circular Polarized VTX Antenna

A circular, polarised video transmitter antenna for use with 5.8GHz FPV systems.



It is the same as the camera used on the Airgeeners Tyrant-S racing drone, so it is an ideal replacement if the original gets damaged.

Features:

- Circular, polarised design for omni-directional signal
- Rugged case to protect element
- Fitted with SMA plug

Type	Order code	1+
Circular VTX antenna	70-1169	2.88

565796

DIATONE INNOVATIONS

Anti-Slip Hook and Loop Battery Strap

It's very important to make sure that your LiPo battery is securely fastened to your drone at all times, even more so if you are racing or doing acrobatics.



This anti-slip battery strap is designed to safely secure a 3S LiPo battery and is identical to the one used on the Airgeeners Tyrant-S racing drone.

Features:

- Hook and loop fastening
- Rubberised anti-slip coating
- Length suited to 3S LiPo batteries
- Size 20 x 200mm
- **Supplied singly**

Type	Order code	1+
Battery strap	70-1171	0.35

565798



11.1V 1550mAh 3-cell 75C LiPo Battery

Drone racing puts some serious strain on your batteries, so it is vital to have something that is capable of delivering the power when it matters.



These Tattu batteries are recommended for the Airgeeners 3S class racing drones.

Features:

- 3S, 11.1V
- 1550mAh capacity
- High 75C discharge rating
- XT60 power connector
- XH style balance connector

Note: Lithium Polymer (LiPo) batteries should always be charged and stored in a LiPo safety bag, see order code 70-1178.

Type	Order code	1+
1550mAh LiPo battery	70-1186	16.40

565789

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on all orders over £30 (excl. VAT)
(UK mainland only)

* See Terms & Conditions for full details - www.rapidonline.com/terms

VOLTCRAFT®

LiPo Battery Charger

The Voltcraft V-Charge Eco is a plug-and-play charger for 2, 3 and 4S LiPo rechargeable batteries.



Simply connect the battery via its balance connector, plug into the socket and wait until the battery is fully charged - done! It's that easy!

Features:

- Plug and play
- Suitable for 2, 3 or 4S LiPo batteries
- 3A maximum charge current
- XH style balanced charge connectors

Note: Lithium Polymer (LiPo) batteries should always be charged and stored in a LiPo safety bag, see order code 70-1178.

Technical specification	
Max. charging capacity	35W
Charging current (max.)	3A
Operating voltage	230V AC
Width	72mm
Length	117mm
Height	40mm
Weight	178g

Type	Order code	1+
LiPo battery charger	70-1187	21.53

565808



5-piece Basic Electronics Tool Kit

- Side cutters
- Pliers
- Flat blade screwdriver
- Phillips screwdriver
- Wire strippers
- Zip case

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£8.91

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