

Elite

by Europa Aircraft





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Europa Aircraft

History

The story of Europa Aircraft began in the 1990s; born from a dream to build a small kitplane capable of quiet, comfortable, high speed, low cost touring. The basic concept was to produce an aircraft that made real flying affordable and possible – an aircraft that could:

- be built and be stored at home
- be easily transported on its own trailer
- operate on car fuel
- be rigged and ready for flight in under ten minutes
- carry two people in comfort
- provide sufficient baggage for extended touring
- take off and land on unprepared grass fields

The original model, the Europa Classic, achieved all of these objectives. It was easily capable of being rigged and de-rigged by a crew of two, road transportable for home storage on a purpose-built trailer, able to use short, unprepared grass runways with STOL performance, economical to operate, fast, cost effective, simple to construct, and easy to maintain and environmentally friendly.



The Europa Classic sold in hundreds, making a firm impression on the kit plane industry, and in 1995, the first Europa built by a home constructor was airborne.



The Europa Classic was by now a strong contender in the self build area, however it was the launch of the Europa XS that gained the company massive acclaim worldwide. The Europa XS was available in two versions – the Europa XS Monowheel and the Europa XS Trigear. It had pre-formed hollow wings, more streamlined cowling, extended tailwheel and enlarged baggage bay. These developments meant that the new Europa aircraft still fulfilled the original objectives, but now offered extra speed, extra range, extra baggage space and extra comfort. It was also designed to reduce the build time and maximise the pleasure of the build process – developments that were welcomed by builders and pilots.

The Europa XS was named one of the UK's Millennium Products. These products were chosen following a nationwide initiative run by the Design Council to identify and promote products and services demonstrating British business innovation. When Prime Minister unveiled the products in London, he said "The Millennium Products chosen today show the range of creativity and innovation in this country. These are world-beating designs that will help improve the quality of our lives in the next century"

Most recently, Europa launched the Europa Motor Glider for those pilots who like to fly with their engines switched off – most impressively, the glider wings can be interchanged with the wings on the Europa XS Monowheel and Trigear, providing even more choice for the Europa customer.



In the last twenty years, Europa Aircraft has grown to be one of the most successful British kit plane suppliers, with over 1000 kits sold, and Europas (Classic and XS models) flying at last count in 33 countries on 6 continents. It has a very enthusiastic, loyal and supportive team behind it and a huge following.

The Europa story is a great one and has a heritage that will continue to be built upon. The underlying mission, objectives and philosophies of Europa will never change, but Europa will continue to use innovation, new technology and feedback to ensure the Europa remains the number one composite kit plane of choice for self build enthusiasts and pilots throughout the world.



The ELITE

Most recently, Europa Aircraft announced the launch of the brand-new Elite. This aircraft is an all composite, two seat, side by side aircraft with unique characteristics. The aircraft is capable of intentional spinning and day and night operations under VMC and IMC. It can also be fitted with an integrated Ballistic Recovery Parachute for peace of mind.

Unrivalled speed, agility, style and luxury makes the Elite superior in its class.



The Elite has been designed to a recognised international standard, the latest amendment to CS/FAR 23, and with philosophies of the company in the forefront.

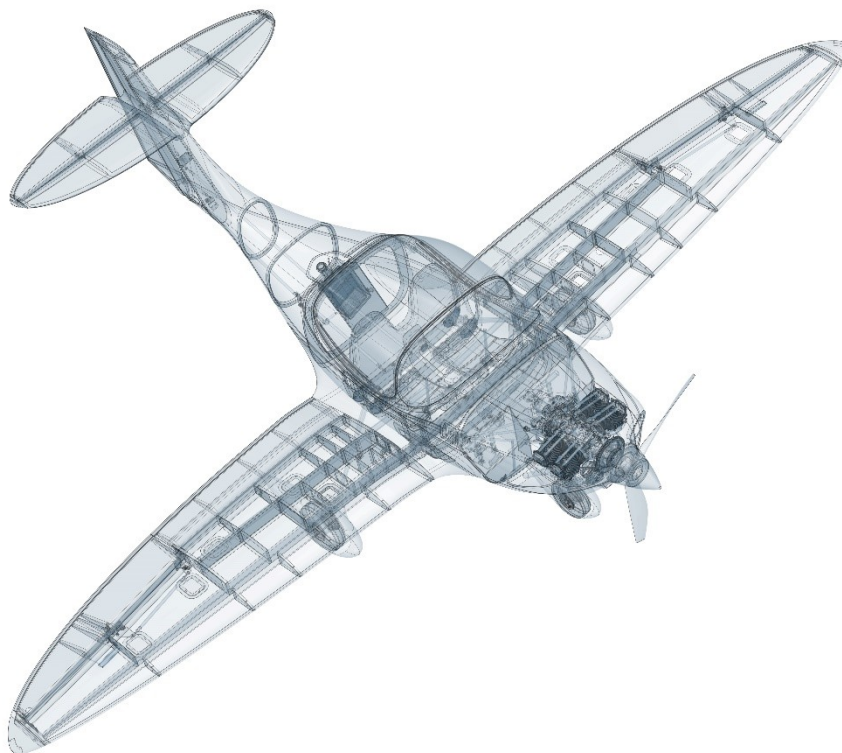
The underlying design principle of the Elite is to build an 'honest' aircraft suitable for flying in the 21st Century, with a modern appearance and built in safety features.

'Honest' in that:

- it will carry two 21st century-sized people together with fuel and substantial luggage.



- it can house a number of engines and, even with the smallest engine, provide a good performance. Many non-certified engines out-perform certified engines and the Elite will offer a platform to accommodate these.
- it does not have to be finished in white and can be decorated in a scheme of the owners choosing in any colour.
- it can be flown in many conditions. Our planet does not offer a standard climate, with vast temperature and humidity ranges, the Elite can accommodate much of this variation.
- it can be built quickly and easily with build assist options from Europa Aircraft.



Aerobatic Manoeuvres

This variant of the Elite will not be approved for aerobatics. For aerobatics you will need the Elite+.



Elite - Outline Specification

| Elite / Elite ^{HT} | | |
|-----------------------------|---------------|----------------|
| Crew | Max Two | |
| MTOM | 750 | kg |
| g limits | +4.4 / -2.2 | |
| Minimum Useful Load | 279 | kg |
| Max Fuel Capacity | 110 | litres |
| Wing Area | 10.885 | m ² |
| Wing Aspect Ratio | 8.054 | |
| Length | 6.430 | m |
| Wingspan | 9.340 | m |
| Height | 2.350 | m |
| Cockpit Width | 1.240 | m |
| Design Pilot Height | 1.924 (6' 4") | m |
| V _{SO} | 45 | kts |
| V _A | 118 | kts |
| V _{NE} | 167 | kts |
| MOL (Elite) | 54 | °C |
| MOL (Elite ^{HT}) | 80 | °C |

Engine and propeller

The aircraft is suited for several different engine and propeller combinations. The current maximum combined engine and propeller mass is 136 kgs. As well as the latest engines from Rotax and UL Power it will also enable the installation of the more conventional Lycoming 235 and Continental 200 / 240 ranges.

Operational Limits

Temperature (MOL)

The maximum operating limit is set at 54°C for the Elite and 80°C for the Elite^{HT}. This enables the Elite^{HT} to be continually operated in an ambient temperature of just under 35°C whilst having a black overall finish. If it is kept out of direct sun prior to flight it is possible to operate in higher ambient temperatures. Further information is provided later on in this quotation.

Altitude

Operation ranges from sea level to 3,048 m (10 000 ft).



Elite - Basic description

The Elite / Elite^{HT} is a single engine, two seat side-by-side, low-wing all-composite aircraft. The aircraft's structure is of carbon fibre and glass fibre composite construction. The engine compartment is separated from the crew compartment by a composite and stainless-steel skinned firewall. The aircraft is Ballistic Recovery System capable. Further details of the critical components are provided below.

Wing

Wings are made with a carbon fibre "C" section spar and glass GRP skins with foam cores. Generally, the wing foam cores are 5 mm thick. The wings comprise two halves that are joined at the centre using two shear pins that pass through two fuselage frames and the shear webs of the wing spars. The wing torsion is handled via a root rib pin. The wing is of an elliptical planform. The overall elliptical planform comprises two separate ellipses, namely the LE Ellipse and the TE Ellipse that join at the zero sweep line, which is located at 27.5% of the wing chord. The wing is of a single spar design with ailerons, electrically operated slotted flaps and integral fuel tanks.

The aerofoil section at the wing root has a 13% thickness to chord ratio that increases to 15% thickness to chord at the tip. The wing has a geometric twist of -2.81° and a dihedral angle of 4° .

Fuselage

The fuselage is made with a 5 mm foam cored GRP semi-monocoque construction. The semi-monocoque structure comprises the skin and 8 frames located down the length of the fuselage. It hosts the supports of the flight controls which are interfaced by means of angular connections and reinforcements. Most of the avionics equipment are installed in the back of the control panel.

Access to the aircraft is through a two piece canopy. The front part of the canopy is fixed whilst the rear part moves rearwards to allow egress.

Ballistic Recovery Parachute

This will be located behind the crew compartment. The straps are located below a sacrificial outer fuselage skin that will be torn through upon deployment.

Seats

Two seats are provided with headrests. The seats are fixed with vertical adjustment through cushions. Any leg length adjustment will be through the adjustable rudder pedals. The rear of the seat is inclined 13° and is provided with a multi-point seat harness.

Empennage

The empennage consists of a vertical tail surface and a horizontal tail surface with right and left elevators interconnected by the control transmission. The vertical tail surface is trapezoidal and consists of a vertical stabilizer and a rudder. The horizontal tail surface is of an elliptical planform with separate LE and TE ellipses.



The horizontal tail forms a “cruciform” configuration.

Flight surfaces and controls

The flight surfaces consist of conventional ailerons, elevator, and rudder. All surfaces are deflected through push rods. There is one elevator trim. The elevator trim and wing flaps are electrically actuated. The wing flaps are of the slotted type.

The chord ratios and movements of the flight and control surfaces are as follows:

Ailerons:

Chord Ratio: 32.5%

Movement: Up: 14° / Down 10.5°

Flaps

Chord Ratio: 25%

Movement: 0°/17°/32.5°

Rudder

Chord Ratio: 26.1%

Movement: +/- 30°

Elevator

Chord Ratio: 40%

Movement: +/- 14.5° (Static) +/- 13° (Dynamic)

Landing gear and brakes

The nose gear is of a steerable single 5.00-5 type and consists of a tubular oleo pneumatic leg connected to a support frame that connects through the firewall to the fuselage structure.

The main landing gear system consists of two faired struts, wheels with Beringer disk brakes and wheel fairings. The struts absorb the landing shocks and are made of high tensile steel. Two wheels 6.00-6 for main landing gear are installed. Wheel brakes are operated individually using the brake pedals either on the pilot or the co-pilot's side.

Heat and ventilation

The ventilation system features one vent outlet for each occupant. The heating system is provided to warm the cabin and through a defrost manifold prevent the windshield from fogging.

Finish Colours

Within the design codes there is a provision which is sometimes construed to limit the colour of a composite aircraft to all white and the temperature to 54°C. This temperature is the one that an all white aircraft could reach with an external temperature of 38°C (ISA +23°C). Not everyone operates in an environment in which these conditions exist and in which the UV intensity is such that the critical structural temperature will warm too it.



The main temperature limitation to a composite airframe is the Wet Tg of the material used, which is both a function of the resin system adopted and the temperature at which it is cured. Obviously, the allowable design stresses of the material are also of importance but generally this is secondary to the glass transition temperature, since once this is exceeded the material rapidly loses its structural integrity. Actually, the material loses its structural integrity before the Wet Tg is reached and a general rule is that the difference between the Wet Tg and the MOL is 28°C.

A higher material Wet Tg will lead to fewer restrictions on the colour that the aircraft can be finished for safe flight and this is the advantage offered by the Elite^{HT}. As indicated in the image below it is possible with the Elite^{HT} to have an aircraft that can be finished in a completely black scheme.



The most reliable method to determine the structural temperature is the use of temperature gauges in the structure or as recently allowed by EASA the use of a handheld temperature meter.

In the table below we have provided information on the ISA+ impact on the allowable UV absorption of the finish colour in still air for the Elite with its corresponding MOL of 54°C. We have not included any safety factors in these values unlike the data presented in AMC VLA 613(c) of CS-VLA which seemingly includes for a 10°C safety margin and a 6.7°C cool down during taxi. The reason for the allowance of the cooling down during taxi is the beneficial impact of forced convection as opposed to natural convection when the aircraft is stationary. The noted graph in CS-VLA is also based on still conditions and is considered worst case as it is also in clear skies. The actual testing was performed around 1978.

| ISA + | Ambient Temperature | Solar Absorptivity | MOL (°C) | Colour |
|--------|---------------------|--------------------|----------|----------------------------|
| 0°C | 15°C | 0.6 | 54.0 | |
| 6.2°C | 21.2°C | 0.5 | 54.0 | Light Green / Light Yellow |
| 12.1°C | 27.1°C | 0.4 | 54.0 | |
| 18.0°C | 33.0°C | 0.3 | 54.0 | Aluminium |
| 23.8°C | 38.8°C | 0.2 | 54.0 | White |



For the Elite^{HT} the following data is derived. Note we did not extend past an ambient temperature of 50.9°C.

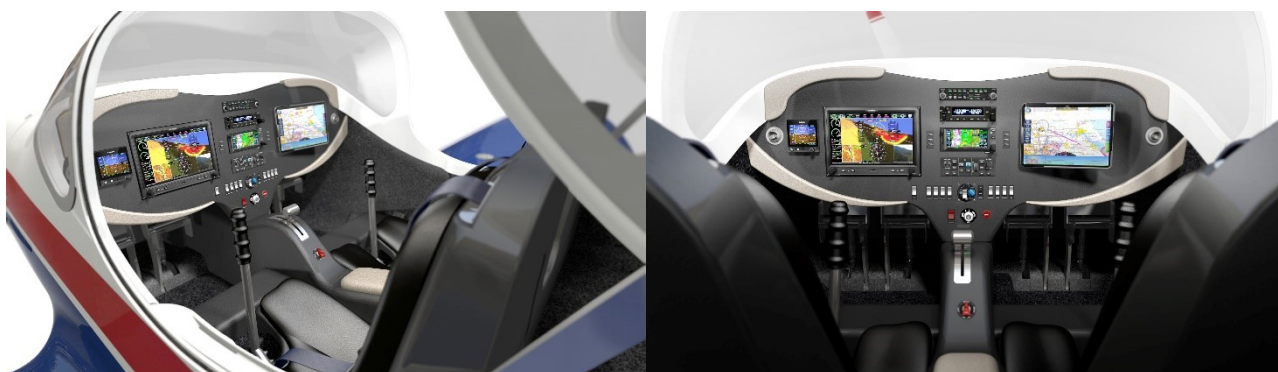
| ISA + | Ambient Temperature | Solar Absorptivity | MOL (°C) | Colour |
|--------|---------------------|--------------------|----------|----------------------------|
| 9.9°C | 24.9°C | 1.0 | 80.0 | |
| 14.6°C | 29.6°C | 0.9 | 80.0 | |
| 19.7°C | 34.7°C | 0.8 | 80.0 | Black or Dark Blue |
| 25.1°C | 40.1°C | 0.6 | 80.0 | |
| 35.9°C | 50.9°C | 0.5 | 80.0 | Light Green / Light Yellow |
| - | | 0.2 | 80.0 | White |

So, the advantages of the Elite^{HT} is that you can finish your aircraft in pretty much any scheme that you want.



Aircraft Equipment

The aircraft can be fitted with both the latest digital EFIS as well as analogue instruments.





Build FAQ's

This FAQ's are based on regularly asked questions.

How long will my Elite take to Build?

The previous model to the Elite, the Europa XS took on average 800 man hours, with the quickest just under 400 hours. There were two recurring builder requests to reduce the build time, the first was to reduce the amount of composite or gluing work and the second was to increase the predrilling of pilot / positioning holes. In the design of the Elite we have done this. In every kit all the necessary holes for the attachment of any metal fixture to the composite structure are pre-drilled so you will have the confidence that everything is in the correct location. Also, if you make use of the Quick Build 1 option no composite or gluing work is required.

It is impossible to provide an actual time as it is dependent upon the skill and speed of the builder, the level of avionics and instrumentation, the paint and interior finish. Stopping and starting the build usually increases the build time as you are continually reminding yourself where you got to and what to do next. Using our Build Assist option will overcome this as you have periodic intensive sessions, meaning that you will progress faster

How much space do I need to build my Elite?

You can never have too much space to build!

A double garage is ideal, but components of the kit can be built in a single garage of 18' by 8'. Once you need to attach the wings, you will need at least 30ft across the diagonal for short periods, but many of our builders do this outdoors as at this stage it is nearing the finishing touches.

Do I need any special skills to build the Elite?

No, the build manual and kits are designed for a first-time builder, with no experience in building aircrafts or composites. The build manual provides the builder with step by step instructions of what to do, how to do it and when to do it.



Price

This quotation is for the supply of a full Elite and the Elite^{HT} kit.



The nett prices are:

Elite: £60,215

Extra for Elite^{HT}: £6,500 (This involves an additional post cure for the composite structure)

Extra for Ballistic Recovery Parachute: £9,655 (This can be installed at a later date if requirements change)

Quick Build 1 (Elimination of all composite / gluing operations): £5,650

Exclusions

Although this quote does not currently include for the following, Europa Aircraft can provide these products and services.

- Firewall Forward + Engine
- Propeller
- Internal upholstery
- Instrumentation / Avionics
- Lights
- Finishing (Paint or Vinyl Wrap)



Factory Build Assist

Europa Aircraft offers a Factory Build Assist program and Finishing Service. The Build Assist program can be tailored to your individual needs, prices vary according to requirements.

Delivery

Delivery is approximately 20 working weeks from order placement however this will depend on workload at time of order.

Commercial Section

Terms and Conditions

Europa Aircraft (2004) Limited Terms and Conditions apply

Payment Terms

The offer is based on stage payments and payment terms against milestones as stated below for your approval.

50%: Deposit on Order Placement

25%: Midway through build

25%: Prior to Shipment

Validity

These prices are fixed and firm for a period of 30 days from date of quotation and shall not be subject to escalation throughout the contract period.

Value Added Tax

Our main offer excludes value-added tax or other imposts or taxes levied thereon by the Government Authorities.