

COSMIK AVIATION 

PILOT'S OPERATING HANDBOOK

EV-97 teamEUROSTAR UK



PILOT'S OPERATING HANDBOOK FOR MICROLIGHT AEROPLANE

EV-97 teamEurostar UK

Model: EV-97 TEAM EUROSTAR

Registration: G-COEP

Serial No. 2128

Approved by:

This aeroplane must be operated in compliance with the information and limitations contained herein.

This POH must be available on board the aeroplane.

WARNING

This aeroplane is not fitted with a certified engine. A power failure can occur at any time. Never fly over any area on to which a safe landing cannot be made in the event of an engine failure.

Table of Contents

SECTION 1 – GENERAL INFORMATION AND TECHNICAL DATA	6
1.1 Introduction.....	6
1.2 Certification basis.....	6
1.3 Warnings, cautions and notes	6
1.4 Descriptive Data.....	6
SECTION 2 - LIMITATIONS	9
2.1 Introduction.....	9
2.2 Airspeed.....	9
2.3 Airspeed indicator markings	9
2.4 Powerplant.....	10
2.5 Powerplant Instrument Markings.....	11
2.6 Miscellaneous instrument markings	11
2.7 Weight	11
2.8 Centre of Gravity.....	11
2.9 Approved manoeuvres.....	12
2.10 Manoeuvring Load Factor.....	12
2.11 Crew.....	13
2.12 Kind of Operations.....	13
2.13 Fuel	13
2.14 Maximum Passenger Seating	13
2.15 Other Limitations	13
2.16 Limitations Placards.....	14
SECTION 3 - EMERGENCIES	16
3.1 Introduction.....	16
3.2 Engine failure	16
3.3 In-Flight start	17
3.4 Smoke and fire	17
3.5 Glide	18
3.6 Emergency Landings	18
3.7 Precautionary landing.....	18
3.8 Landing with a flat tyre	19
3.9 Landing with a defective landing gear.....	19
3.10 Recovery from unintentional spin	19
3.11 Other emergencies.....	19
SECTION 4 – NORMAL OPERATIONS	21
4.1 Introduction.....	21
4.2 Assembly and disassembly.....	21
4.3 Pre-flight inspection.....	21

4.4 Normal procedures.....	23
SECTION 5 - PERFORMANCE.....	28
5.1 Introduction.....	28
5.2 Airspeed Indicator System Calibration.....	28
5.3 Stall Speeds.....	29
5.4 Take-off performance.....	29
5.5 Landing distances.....	29
5.6 Climb performance.....	30
5.7 Cruise.....	30
5.8 Horizontal Speeds.....	31
5.9 Endurance.....	31
5.10 Baulked landing climb.....	32
5.11 Environmental Effects on Flight Performance and Characteristics.....	32
5.12 Demonstrated crosswind performance.....	32
5.13 Ceiling.....	32
SECTION 6 – WEIGHT AND BALANCE.....	33
6.1 Introduction.....	33
6.2 Permitted Cockpit Loads.....	33
SECTION 7 - AEROPLANE AND SYSTEMS DESCRIPTION.....	34
7.1 Introduction.....	34
7.2 Airframe.....	34
7.3 Cockpit Controls.....	35
7.4 Landing gear.....	35
7.5 Seats and safety belts.....	35
7.6 Baggage compartment.....	35
7.7 Canopy.....	36
7.8 Powerplant.....	36
7.9 Fuel system.....	36
7.10 Electrical system.....	37
7.11 Pitot and Static Pressure Systems.....	38
SECTION 8 - AEROPLANE GROUND HANDLING AND MAINTENANCE.....	39
8.1 Introduction.....	39
8.2 Aircraft inspection periods.....	39
8.3 Aircraft alterations or repairs.....	39
8.4 Ground handling / Road transport.....	39
8.5 Cleaning and care.....	41

SECTION 1 – GENERAL INFORMATION AND TECHNICAL DATA

1.1 Introduction

This Pilot's Operating Handbook has been prepared to provide pilots and instructors with information for the safe and efficient operation of the EV-97 teamEUROSTAR UK microlight aeroplane. It also contains supplemental data which may be found useful.

1.2 Certification basis

The EV-97 teamEUROSTAR UK has been approved by UK Civil Aviation Authority against the requirements of BCAR section S.

1.3 Warnings, cautions and notes

The following definitions apply to warnings, cautions and notes in the flight manual:

WARNING

Means that the non-observation of the corresponding procedure leads to an immediate or significant degradation of the flight safety.

CAUTION

Means that the non-observation of the corresponding procedure leads to a minor or possible long term degradation of the flight safety.

NOTE

Draws attention to any special item not directly related to safety, but which is important or unusual.

1.4 Descriptive Data

1.4.1 Aircraft description

EV-97 teamEurostar UK is an aircraft intended for recreational and touring flying and is limited to non-aerobatic operations in Visual Meteorological Conditions (VMC). It is a single engine, all metal, low-wing monoplane of semi-monocoque construction with two side-by-side seats. The aeroplane is equipped with a fixed tricycle undercarriage with a steerable nose wheel.

The powerplant is a ROTAX 912 (80 hp), four cylinder, four stroke engine driving a two blade V230C, fixed wooden propeller (standard propeller). An alternative GT 166 x 145 fixed pitch wooden propeller may also be fitted. The engine is fitted with a gearbox having a reduction ratio of 2.27:1.

1.4.2 Technical Data

Wing

Span	8.1	m	26.57	ft
Area	9.84	m ²	105.92	ft ²
Mean Aerodynamic Centre (MAC)	1.25	m	4.10	ft
Wing Loading	45.7	kg/m ²	9.37	lb/ft ²
Aileron area	0.21	m ²	2.26	ft ²
Flap area	0.52	m ²	5.60	ft ²

Fuselage

Length	5.98	m	19.62	ft
Width	1.04	m	3.41	ft
Height	2.34	m	7.67	ft

Horizontal tail unit

Span	2.5	m	8.20	ft
Area	1.95	m ²	20.99	ft ²
Elevator area	0.8	m ²	8.60	ft ²

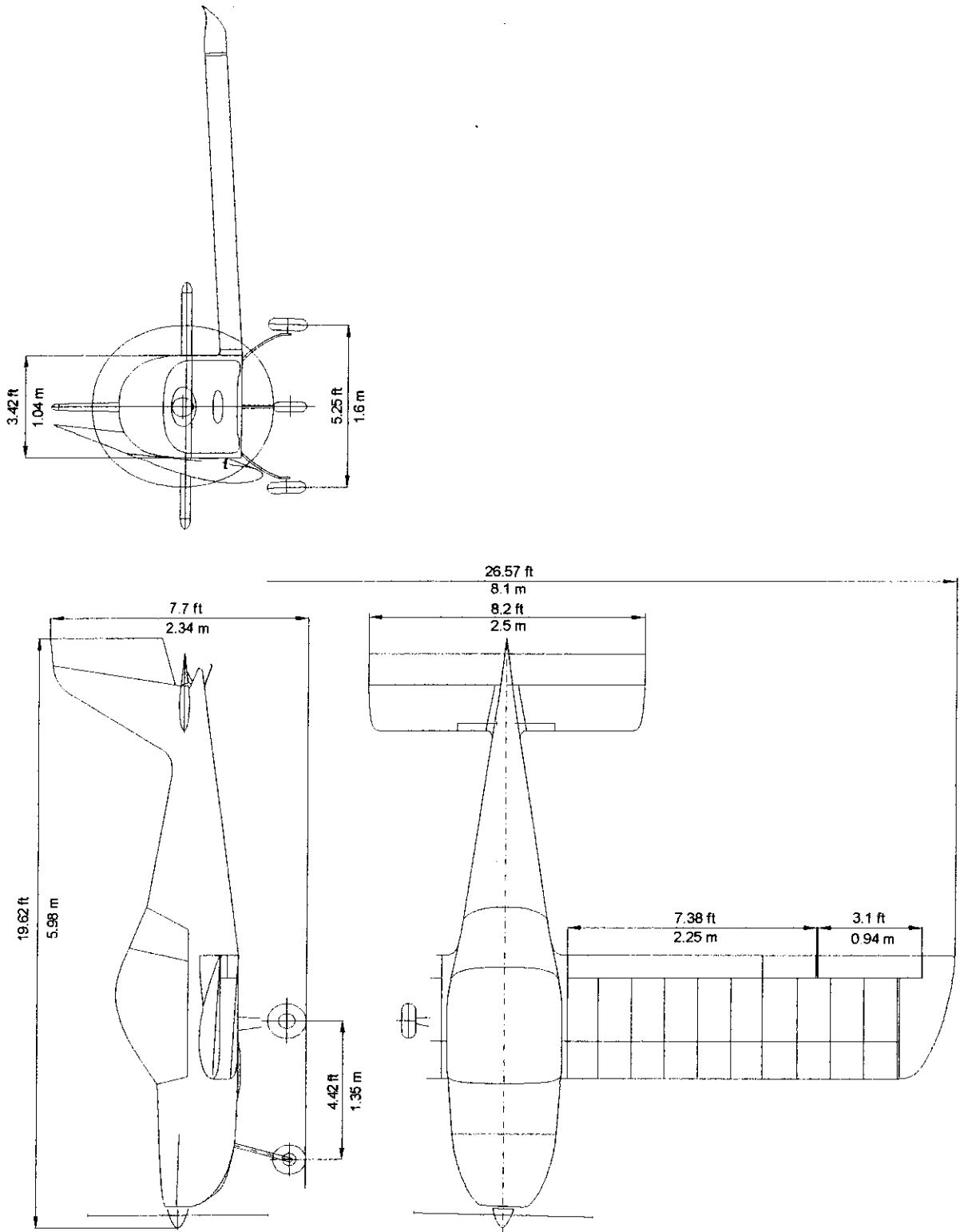
Vertical tail unit

Height	1.24	m	4.07	ft
Area	1.0	m ²	10.76	ft ²
Rudder area	0.4	m ²	4.30	ft ²

Landing gear

Wheel track	1.6	m	5.25	ft
Wheel base	1.35	m	4.42	ft
Main wheel diameter	350	mm	14	in
Nose wheel diameter	350	mm	14	in

1.4.3 Three-view drawing



SECTION 2 - LIMITATIONS

2.1 Introduction

Section 2 includes operating limitations, instrument markings and basic placards necessary for the safe operation of the aircraft, its engine, standard systems and standard equipment.

2.2 Airspeed

Airspeed limitations and their operational significances are shown below:

Speed		IAS mph	Remarks
V _{NE}	Never exceed speed	146	Do not exceed this speed in any operation.
V _A	Manoeuvring speed	100	Do not make full or abrupt control movement above this speed, because under certain conditions the aircraft may be overstressed by full control movement.
V _{NO}	Maximum structural cruising speed	118	Do not exceed this speed except in smooth air, and then only with caution.
V _{FE}	Maximum Flap. Extending speed	77	Do not exceed this speed with flaps extended.

2.3 Airspeed indicator markings

Airspeed indicator markings and their colour-code significances are shown below:

Marking	IAS value or range mph	Significance
White arc	40 – 77	Positive Flap Operating Range.
Green arc	49 – 118	Normal Operating Range.
Yellow arc	118 – 146	Manoeuvres must be conducted with caution and only in smooth air.
Red line	146	Maximum speed for all operations.

The lower end of the white arc is $1.1 V_{SO}$
 The lower end of the green arc is $1.1 V_{S1}$

2.4 Powerplant

Engine Model:		ROTAX 912 UL	
Engine Manufacturer:		Bombardier-Rotax GMBH	
Power	Max Take-off:	59.6 kW / 80 hp at 5800 rpm, max.5 minutes	
	Max. Continuous:	56 kW / 75 hp at 5200 rpm	
	Cruising:	53 kW / 71 hp at 4800 rpm	
Engine speed	Max. Take-off:	5800 rpm, max. 5 min.	
	Max. Continuous:	5200 rpm	
	Cruising:	4800 rpm	
	Idling:	~1400 rpm	
Cylinder head temp.	Minimum	60 °C	140 °F
	Maximum	150 °C	302 °F
Oil temp.	Minimum	50 °C	122 °F
	Maximum	140 °C	284 °F
	Optimum	90 – 110 °C	194 - 230°F
Oil pressure	Maximum	7,0 bar	
	Minimum:	1,5 bar	
	Optimum:	1,5-4,0 bar	
Fuel:	see 2.13		
Fuel Pressure	min. 0.15 bar, max. 0.4 bar		
Oil:	Automotive engine oil of registered brand with gear additives, but not aircraft oil (refer to engine Operator's Manual). API classification SF or SG.		
Propellers and Manufacturers	V 230C	GT-2/166/VSR FW101 SRTC	
	VZLÚ Praha, Czech Republic	GT Propellers Riccione Italy	
Types:	Two blade fixed wooden propeller	Two blade fixed wooden propeller	
Propeller diameters:	1625 mm	1660 mm	
Propeller pitches:	18°20' - 18°55'	1450 mm	

WARNING

The Rotax 912 UL has not been certified as an aircraft engine and its failure may occur at any time. The pilot is fully responsible for consequences of such a failure. Never fly over an area on to which you cannot safely land in the event of an engine failure.

2.5 Powerplant Instrument Markings

Analogue powerplant instruments are installed in the EV-97 teamEurostar UK aeroplane, with the following markings:

	Minimum Limit	Normal Operating	Caution Range	Maximum Range
Engine speed (RPM)	1400	1400-5200	5200-5800	5800
Cylinder Head Temperature (CHT)	60 °C, 140 °F	60-100 °C 140-212 °F	100-150 °C 212-302 °F	150 °C 302 °F
Oil Temperature	50 °C 122 °F	90-110 °C 194-230 °F	50-90 °C, 122-194 °F 110-140 °C, 230-284 °F	140 °C 284 °F
Oil Pressure	1.5 bar	1.5 - 4.0 bar	4.0 - 5.0 bar	7.0 bar cold engine starting
Fuel Pressure	0.15 bar	0.2 – 0.3 bar	0.3 – 0.4 bar	0.4 bar

2.6 Miscellaneous instrument markings

- Fuel gauge

A fuel reserve of 11 litres (2.42 Imp. gals) is indicated by yellow warning lamp.

2.7 Weight

Empty weight (standard equipment) max. 268 kg 591 lbs

NOTE
Actual empty weight is stated in SECTION 6, par. 6.2

Max. take-off weight 450kg 992 lbs

Max landing weight 450kg 992 lbs

Max. weight of fuel 47kg 104 lbs

Max. baggage weight 15kg 33 lbs

2.8 Centre of Gravity

Empty aircraft C.G. position (standard) 18±2% MAC = 200 – 250 mm AOD

Operating C.G. range 20-34% MAC = 250 – 425 mm AOD

Datum is wing leading edge.

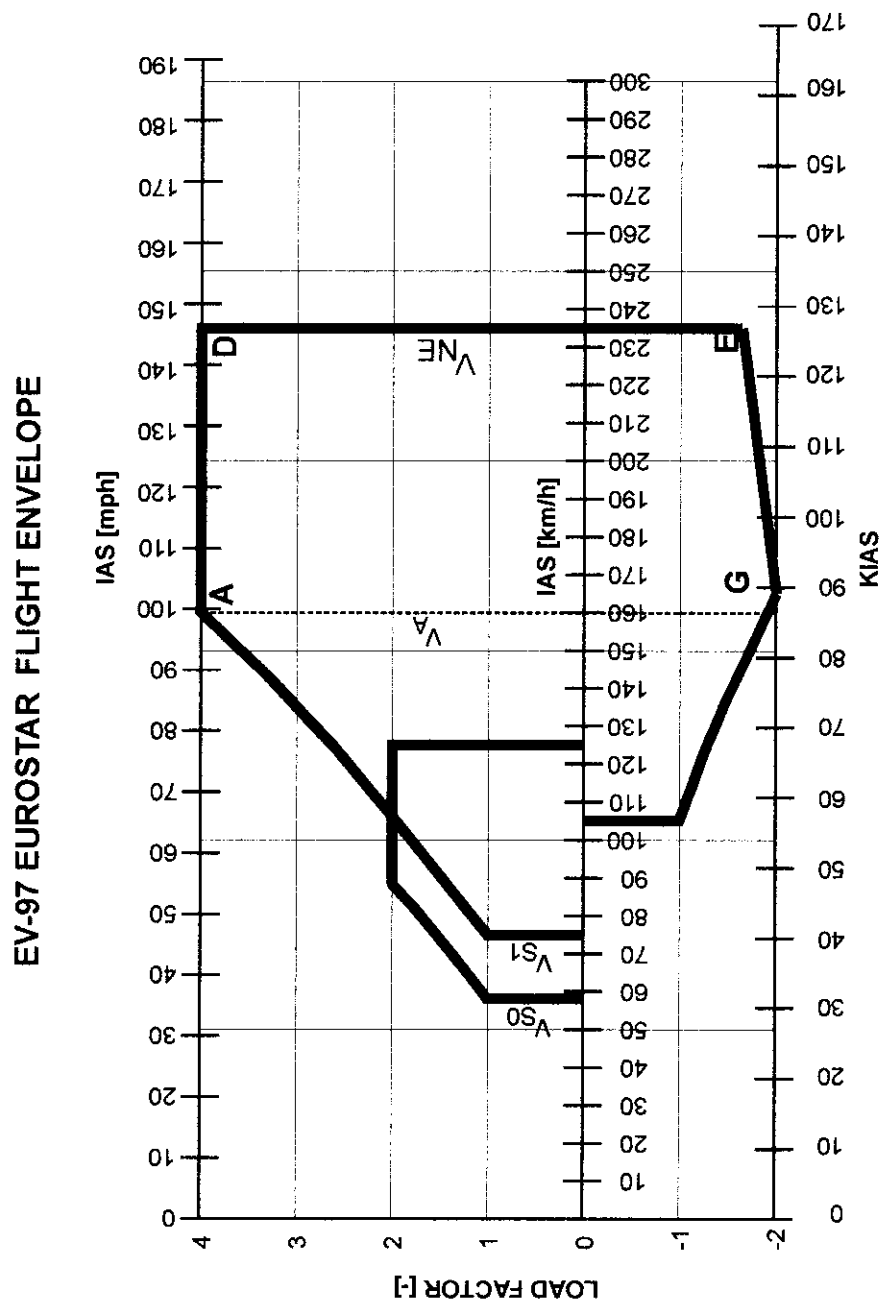
2.9 Approved manoeuvres

Aeroplane Category: Normal; the *EV-97 teamEurostar UK* aeroplane is approved for normal and below listed manoeuvres:

- Steep turns not exceeding 60° bank
- Lazy eights
- Chandelles
- Stalls (except whip stalls)

WARNING
Aerobatics and intentional spins are prohibited !

2.10 Manoeuvring Load Factor



2.11 Crew

Minimum Crew	1
Minimum Crew Weight	55 kg, 121 lb
Maximum Crew Weight	see 6.2

WARNING
Always comply with the maximum take-off weight of 450 kg (992 lbs)

2.12 Kind of Operations

Daytime VFR flights only.

WARNING
IFR flights and flights under icing conditions are prohibited.

Minimum instruments required for VFR flights:

- (i) Airspeed indicator, marked in accordance with 2.3
- (ii) Altimeter
- (iii) Magnetic compass
- (iv) Slip ball

2.13 Fuel

- Regular or premium unleaded automobile fuel to EN228, minimum RON 90.
- AVGAS 100LL. The higher lead content in AVGAS can result in wear of valve seats and increased combustion chamber deposits. Use AVGAS only if other fuels are not available.
- For other suitable fuel types, refer to the engine Operator's Manual.

Fuel tank volume	65 litres	14.3 Imp. gals.
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Unusable fuel quantity	2.9 litres	0.64 Imp. gals.
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2.14 Maximum Passenger Seating

Number of seats	2
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2.15 Other Limitations

Smoking is not permitted on board.

2.16 Limitations Placards

The owner of this aeroplane is responsible for the readability of placards during the aircraft service life.

The following placards are located on the aeroplane:

In view of the pilot:

**Flight limited to daytime VFR non-icing conditions.
Aerobatics and intentional spinning are prohibited. This
microlight aeroplane has not been approved to an
internationally recognised airworthiness standard.**

AIRSPEEDS (IAS)

V_{NE} (Never exceed speed)	146 mph
V_A (Maximum manoeuvring speed)	100 mph
V_{FE} (Flaps extended max. speed)	77 mph
V_S (Stall speed, flaps extended)	36 mph

ENGINE LIMITATIONS

Maximum take-off (max. 5 minutes)	5800 rpm
Max. continuous	5200 rpm
Idle	approx. 1400 rpm
Max. CHT	150°C
Max. oil temp.	140°C
Min. oil temp.	50°C
Min. oil pressure	1.5 bar
Max. oil pressure	7.0 bar
Minimum fuel pressure	0.15 bar
Maximum fuel pressure	0.4 bar

FUEL and LOAD LIMITS

Capacity 65 litres

Unusable fuel 2.9 litres

Maximum take-off weight	450 kg
Max. empty weight	268 kg
Actual empty weight	___ kg
Max. baggage weight	15 kg
Minimum Cockpit Load	55 kg
Cockpit Load incl. Baggage (kg)	Max. Fuel Load (litres)
172 (maximum)	14
160	31
150	44
140	58
135 or less	Full fuel

NOTE

The values stated on the above placard, FUEL and LOAD LIMITS, are valid for the maximum permitted empty weight of the aircraft. If the empty weight is less than the maximum of 268 kg, a customised placard may be used for revised load limits.

CG Limits

Operating C.G. range: 250 – 425 mm AOD
Datum is wing leading edge.

In the baggage area:

**BAGGAGE
MAX.
15 kg**

In view of both occupants:

**NO
SMOKING**

Adjacent to the fuel filler:

**90 RON minimum MOGAS unleaded to EN 228;
or AVGAS 100LL*
Prolonged use of AVGAS 100LL should be avoided.**

SECTION 3 - EMERGENCIES

3.1 Introduction

Section 3 provides checklists and detailed procedures for coping with various emergencies that may occur. Emergencies caused by aircraft or engine malfunction are extremely rare if proper pre-flight inspections and maintenance are practiced.

However, should an emergency arise, the basic guidelines described in this section should be considered and applied as necessary to correct the problem. It is normally impractical to refer to this manual after the emergency has arisen; for this reason, pilots are strongly advised to familiarise themselves with its contents before flight.

3.2 Engine failure

Engine failure during take-off run:

1. Throttle - decrease to idle
2. Ignition - switch off
3. Brake - firmly as required

Engine failure during take-off:

1. Speed - glide at 68 mph.
2. Altitude - below 160 ft (50 m): land in take-off direction.
- over 160 ft (50 m): choose landing area.
3. Wind - find direction and velocity.
4. Landing area - choose free area without obstacles; check for cables.
5. Flaps - extend as needed.
6. Fuel cock - shut off.
7. Ignition - switch off.
8. Propeller - set to the horizontal position by means of starter.
9. Safety harness - tighten.
10. Master switch - switch off before landing.

NOTE

Skip 6-10 if necessary. In an emergency, the pilot's priority is to land safely.

Engine failure in flight:

1. Speed - glide at 68 mph
2. Altitude - below 160 ft (50 m): land in flight direction
- over 160 ft (50 m): choose landing area
3. Wind - evaluate direction and velocity
4. Landing area - choose free area without obstacles
5. Flaps - extend if necessary
6. Fuel cock - shut off
7. Ignition - switch off
8. Propeller - set to the horizontal position by means of starter
9. Safety harness - tighten
10. Master switch - switch off before landing
11. Land

3.3 *In-Flight start*

1. Speed - glide at 68 mph
2. Altitude - check
3. Landing area - choose according to altitude
4. Master switch - switch on
5. Fuel cock - open
6. Choke - as necessary (for cold engine)
7. Throttle - set 1/3 open
8. Ignition - switch on
9. Starter - push button to start the engine

If the engine cannot be started due to a flat battery, and there is adequate height, increase the flight speed to 124 mph so that air flow can rotate the propeller, thus enabling the engine to start.

WARNING

The loss of altitude during in-flight engine starting is about 1300 ft and must be taken into consideration.

3.4 *Smoke and fire*

3.4.1 **Fire on the ground:**

1. Fuel cock - shut off
2. Throttle - fully open
3. Master switch - switch off
4. Ignition - switch off
5. Abandon the aeroplane

Extinguish fire if possible, or call the fire-brigade.

3.4.2 **Fire during take-off roll:**

1. Abort take-off - brake hard
2. Master switch - switch off
3. Fuel cock - shut off
4. Throttle - fully open until fire stops or engine stops.
5. Ignition - switch off
6. Abandon the aeroplane

Extinguish fire if possible, or call the fire-brigade.

3.4.3 **Fire during take-off (climb out):**

1. Fuel cock - shut off
2. Throttle - fully open
3. Speed - 62-68 mph
4. Master switch - switch off
5. Ignition - switch off
6. Land and brake
7. Abandon the aeroplane

Extinguish fire if possible, or call the fire-brigade.

3.4.4 Fire in flight:

1. Fuel cock - shut off
2. Throttle - fully open to use excess fuel.
3. Master switch - switch off
4. Ignition - switch off after using up fuel in carburettors and engine stops.
5. Choose an emergency landing area.
6. Make emergency landing in accordance with 3.5 below.
7. Abandon the aeroplane

Extinguish fire if possible or call the fire-brigade.

NOTE

Estimated time to pump fuel out of carburettors is 30 seconds.

3.5 *Glide*

In the case of engine failure it is important to know and quickly establish the conditions for best glide:

1. Speed - ~68 mph
2. Flaps - retracted
3. Instruments - within permitted limits

3.6 *Emergency Landings*

Emergency landings are generally carried out in the case of engine failure where the engine cannot be re-started.

1. Best glide angle speed - 68 mph.
2. Trim - trim the aeroplane.
3. Safety harnesses - tighten.
4. Flaps - as needed.
5. MAYDAY - report your location if possible.
6. Fuel cock - shut off.
7. Ignition - switch off.
8. Master switch - switch off.

3.7 *Precautionary landing*

A precautionary landing is generally carried out in the cases where the pilot may be disorientated, the aircraft has no fuel reserve, or where bad weather or poor visibility present severe flight hazards.

1. Determine wind direction, choose landing area.
2. Make a PAN call on the radio and report your plan to land. Also state the landing area location.
3. Perform low-altitude passage into wind over the right-hand side of the chosen area with flaps extended to the "TAKE-OFF" position at a speed of 68 mph to thoroughly inspect the area. Pay particular attention to electricity or telephone cables running across the landing area; these are often difficult to see.
4. Perform flight around the chosen area.
5. Perform an approach at increased idling with fully extended flaps.
6. Reduce power to idle when over the runway threshold and touch-down at the start of the chosen area.

7. After stopping the aeroplane switch off all switches, shut off the fuel cock, lock the aeroplane and look for help.

NOTE

Watch the chosen area permanently during precautionary landing.

3.8 Landing with a flat tyre

1. During the landing hold off, keep the damaged wheel above ground as long as possible using the ailerons.
2. Maintain direction during the landing roll using firm rudder pressure.

3.9 Landing with a defective landing gear

1. If the main landing gear is damaged, perform touch-down at the lowest speed possible and attempt to maintain direction during the landing roll.
2. If the nose wheel is damaged, perform touch-down at the lowest speed possible and hold the nose wheel over a runway using the elevator as long as possible.

3.10 Recovery from unintentional spin

WARNING

Intentional spins are prohibited! The procedure below is only for information.

The aircraft has no tendency to spontaneously enter an uncontrollable spin if normal piloting techniques are used.

The following standard procedure can be used to recover from an intentional spin:

1. Throttle - reduced to idle
2. Control stick - ailerons neutralised
3. Rudder pedals - full opposite rudder
4. Control stick - forward, elevator control as required to stop spin.
5. Rudder pedals - immediately after rotation stops, neutralise the rudder.
6. Recover from the dive, take care not to exceed V_{NE} .

3.11 Other emergencies

3.11.1 Vibration

If any forced aircraft vibrations appear:

1. Adjust the engine speed to the setting at which the vibration is minimum.
2. Land as soon as possible; perform a precautionary landing if necessary.

3.11.2 Carburettor icing

The EV-97 teamEurostar UK is fitted with a coolant carburettor heater system which should prevent carburettor icing; however icing may be possible under extreme conditions.

Certain weather conditions, particularly low temperatures and high humidity, give rise to the risk of carburettor icing. The carburettor icing shows itself through a decrease in engine power and an increase in engine temperatures.

To recover the engine power, the following procedure is recommended:

1. Speed - 68 mph
2. Throttle - set for 1/3 power
3. If possible, leave the icing area
4. Increase the engine power gradually to cruise conditions after 1-2 minutes.

If engine power cannot be recovered, make a precautionary landing, depending on the circumstances.

