

XtremeAir Sbach

State-of-the-art aerobatic plane for those with strong stomachs

MODEL TESTED Sbach 342 two-seater

- Price £236,450 ● Power 320bhp ● Torque 622lb ft ● 0-60mph 4.9sec
- Fuel economy 17.0mpg ● CO₂ emissions Prodigious ● Maximum g load +10g/-10g

The XtremeAir Sbach 342. Parachutes: mandatory. Big balls: useful. Love of adrenalin: essential. Top Gun flying skills: optional. You're looking at the world's first all-carbonfibre aerobatics aeroplane. The use of carbonfibre is common on aerobatic and sport aircraft, but until the Sbach 342, the material was used only as a skin wrapped around a traditional steel tube spaceframe. So is the Sbach 342 the Ferrari 458 Italia of the flying world? No, it's more serious than that. A Formula 1 car?

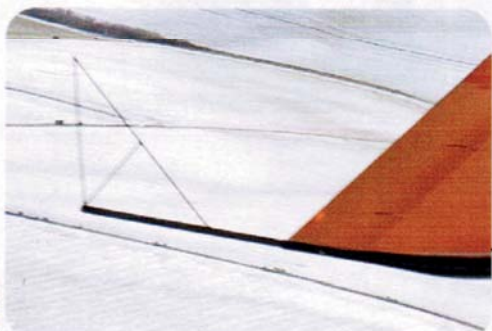
WE LIKE ● Pulling up to 10g ● Performance ● Roll rate of 450deg per second ● Styling



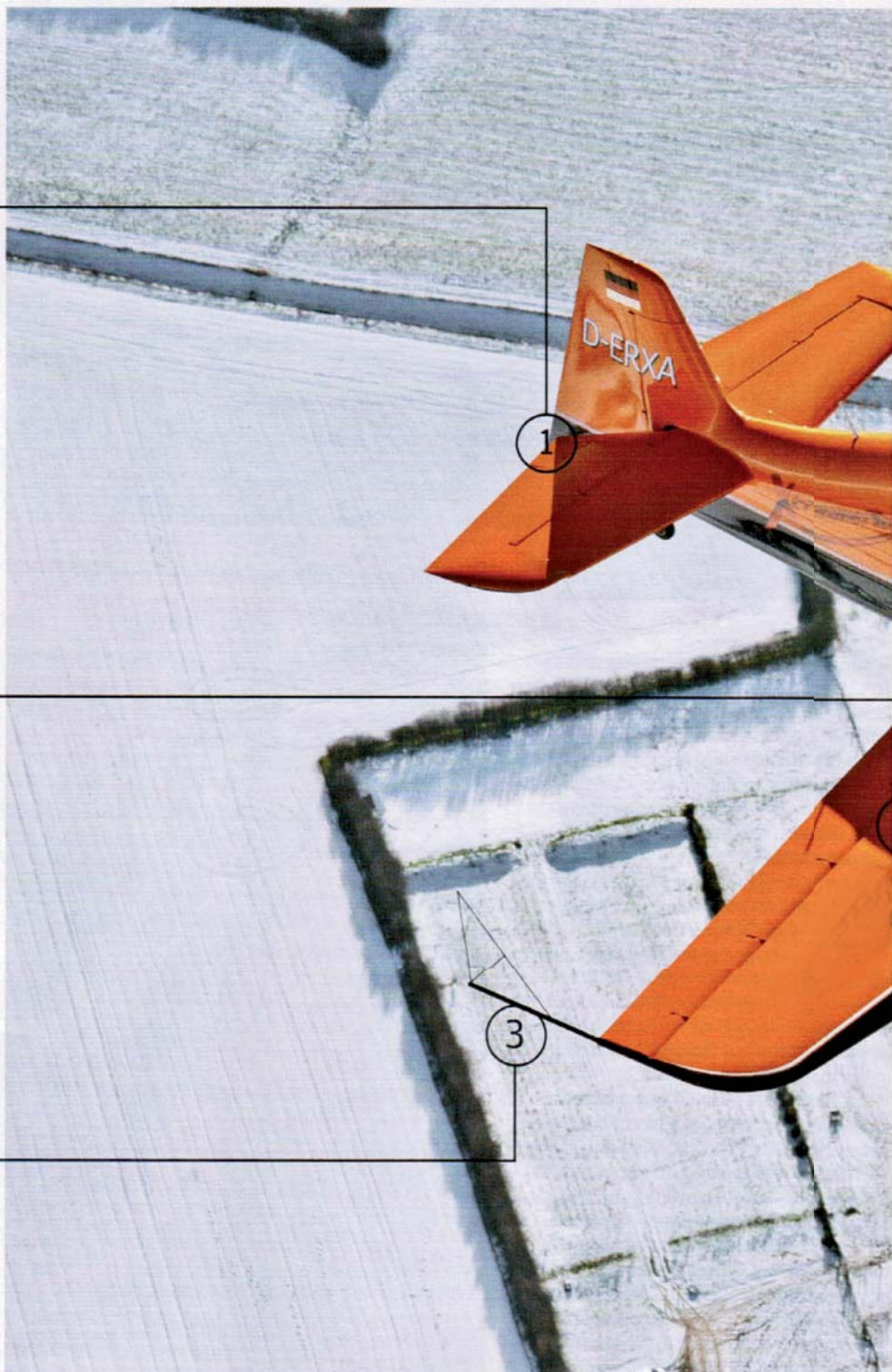
1 Sexy curved bit with arm attached is the trim tab. By adjusting its angle via a knob, the pilot can trim the aircraft to fly hands-off in level flight or in a climb or descent.



2 Funny-shaped device under ailerons is like a servo that reduces effort needed to move ailerons. Also known as aileron spades. Particularly welcome when you're pulling out of a 240mph vertical dive.



3 These pieces of bent wire are to help you judge your position relative to the horizon when doing loops, stall turns and other stomach-upsetting manoeuvres. Also for holding the plane at correct 45-degree angle upside down or right way up.



Nearly, but World Rally Championship car is a closer analogy, because just as a WRC car is easy to drive, so the Sbach is not particularly difficult for an amateur to fly. You could fly it to Goodwood for a cup of tea or to the south of France on holiday, but if you put a pilot of great ability in the cockpit, quite remarkable feats can be done with it. We have witnessed first hand what Richard Burns could do with a rally car, and we're about to experience something equally otherworldly with Gerald Cooper, British unlimited aerobatics champion and ranked seventh in the world.

DESIGN AND ENGINEERING



Up front we have an American Lycoming AEIO-580 six-cylinder aero engine. That's 580 cubic inches, so a mighty 9.5 litres in our money. But you won't be impressed by the power output, because this monster motor produces only 320bhp at 2700rpm. You'll be surprised to read, too, that it is air cooled, that it has only two valves per cylinder (actuated by pushrods), that the fuel injection system is only →

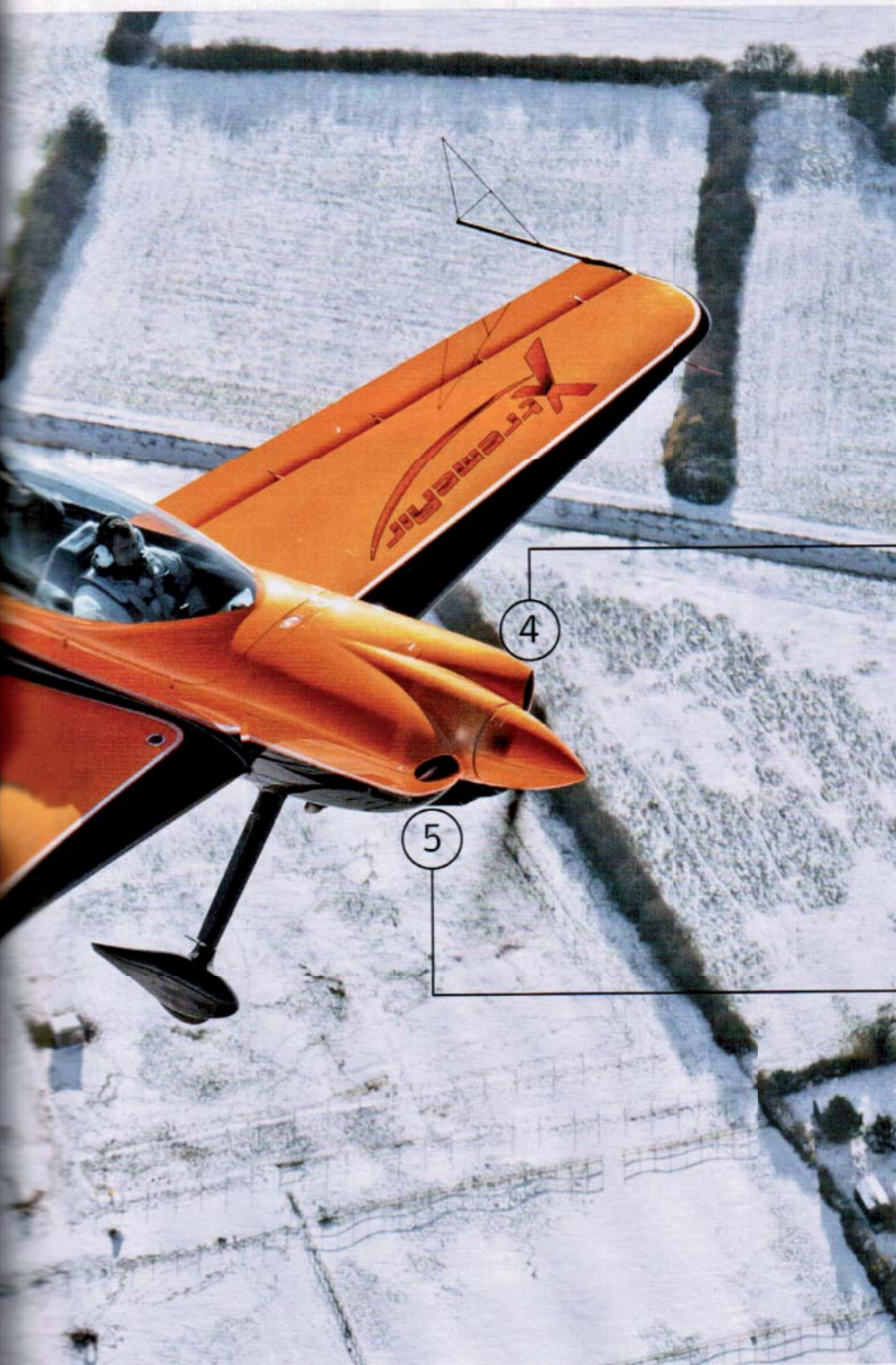
HISTORY

XtremeAir is a German company founded in 2005. As well as producing the Sbach aerobatic aircraft, the firm specialises in the design and production of composite parts. Two models are produced – the two-seat 342 and the single-seat 300 – both of which are imported into the UK by British Unlimited Aerobatics champion Gerald Cooper. No Brit has ever been world champion, but Cooper is hoping to change that. He is, if you like, the Andy Murray of aerobatics. His own Sbach 300 is being built right now, so he has borrowed the two-seat demonstrator from the factory.



Gerald Cooper straps in our Colin, very, very tightly

WE DON'T LIKE ● Chunderous levels of g ● Economy ● We can't afford one

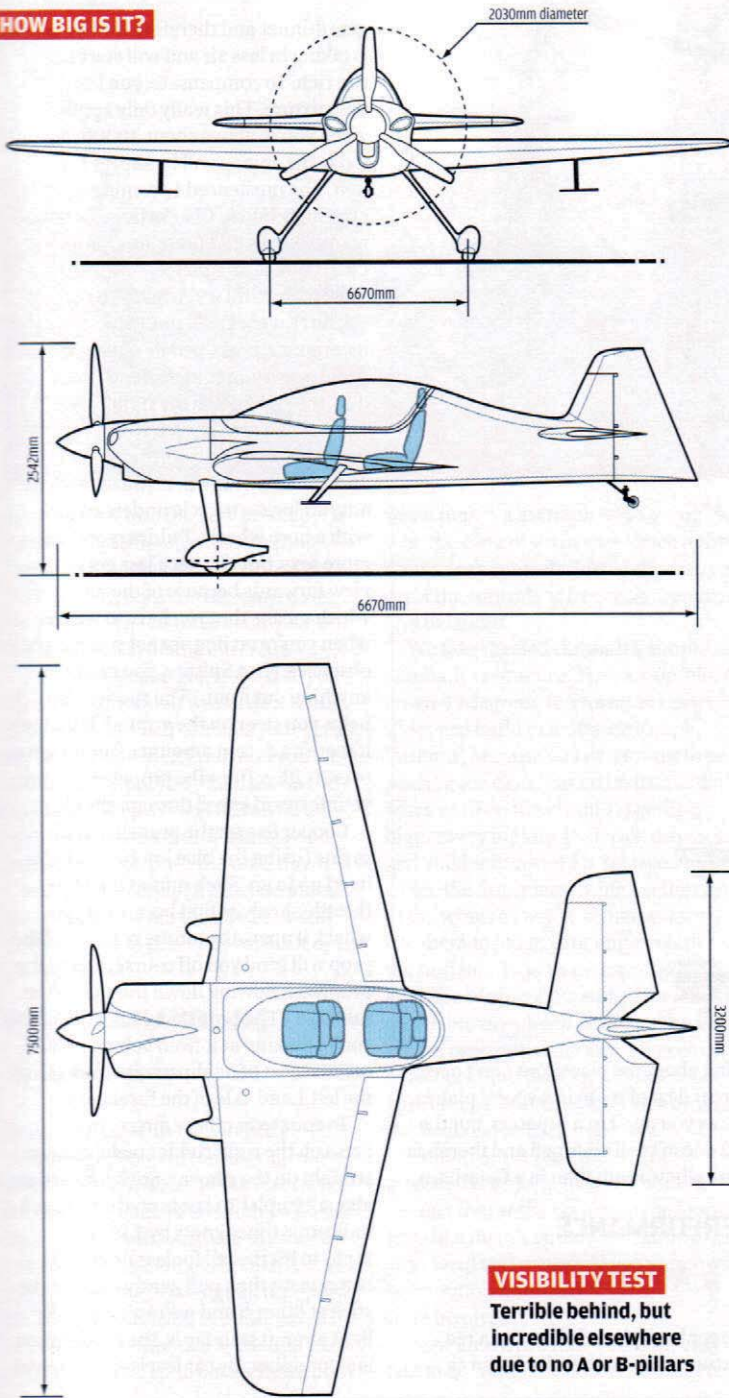


4 Three-blade, variable-pitch propeller has an 80in diameter and costs about the same as a Fiat Panda. Variable pitch allows for optimum take-off and climb performance with a good cruising speed. Engine is an ancient design that's well tested and extremely reliable; you wouldn't want to be seeing any TVR badges here. The big-capacity, low-revving unit has lots of torque, weighs only 204kg and is just 24.5in tall.



5 Lots of air goes in here – and, if you're very unlucky, small birds. Simple single-point fuel injection bungs lots of 100-octane leaded Avgas into the cylinders. Not quite Euro 5 compliant.

HOW BIG IS IT?



VISIBILITY TEST
 Terrible behind, but incredible elsewhere due to no A or B-pillars

← single-point and that the twin spark plugs per cylinder are lit by magnetos. It sounds very old tech, and it is. But an aircraft engine has a very different job description from a car engine's. First, an aircraft engine spends most of its life at close to full throttle. Second, it has to withstand dramatic and swift changes in air temperature. Third – and this you appreciate when you're halfway to Cherbourg over a cold English Channel – it has to be completely reliable.

On to the front of the engine is bolted a three-blade MT propeller with 80in blades. That's a big old prop for an aircraft with an empty weight of only 635kg, but you need big blades to put all that torque to work. The propeller is a variable-pitch unit, which means that the angle of attack of the blades can be changed in flight. Think of a car with a gearbox containing only one ratio. You'd have to choose a ratio low enough

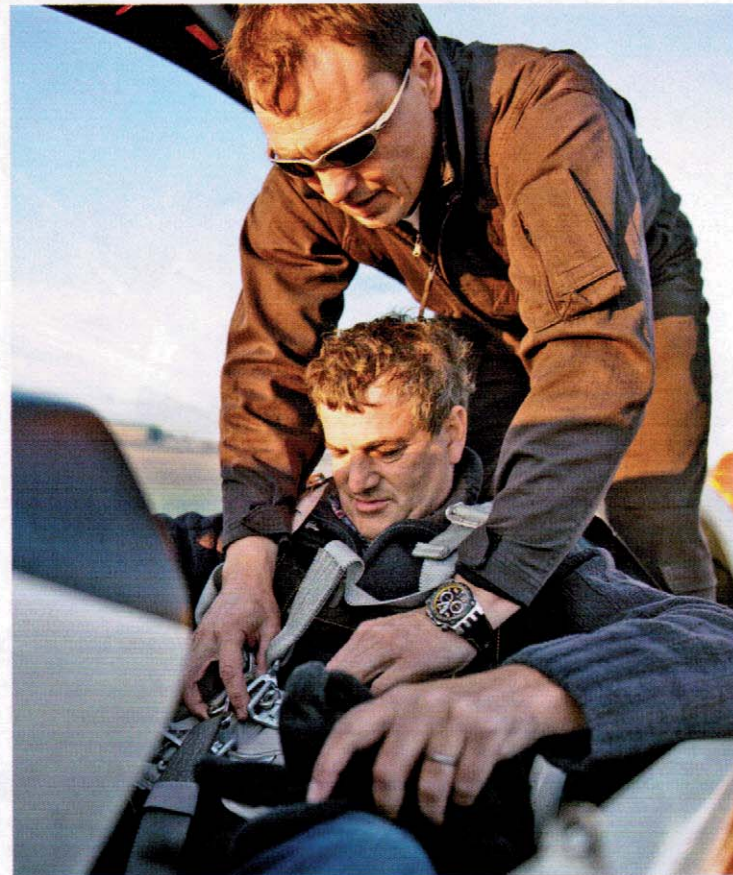
for you to be able to pull away from rest, but high enough to give some sort of cruising ability.

INTERIOR



You fly the Sbach 342 solo from the rear seat. The view is better, but the main reason is that it has less effect on the balance of the aeroplane. Cooper is sat in the rear; we're in the front. I've never sat in a gynaecologist's chair, but this is what it would feel like. You are tipped back, feet above waist level. In the front cockpit, you are provided with only the basic controls that you need to fly the aircraft. At your feet you have two rudder pedals. The rudder doesn't actually steer the aircraft; it controls yaw. Press the right-hand pedal in flight and the aircraft will slip to the right in →

Inside out



Don't owe money to, or sleep with the wife of, the man doing the belts up



Cooper stops smiling when he hears Goodwin's egg McMuffin returning

Approved aerobatic maneuvers and recommended entry speeds		
Maneuver	Min. Entry Speed	Max. Entry Speed
Loop	100 KIAS	225 KIAS
Stall Turn	100 KIAS	225 KIAS
Aileron Roll	80 KIAS	174 KIAS
Snap Roll	80 KIAS	225 KIAS
Tailslice	100 KIAS	225 KIAS
Knife Edge Flight	150 KIAS	225 KIAS
Inverted Flight	Stall	225 KIAS
Spin	Stall	225 KIAS
Inverted Spin	100 KIAS	225 KIAS
1/4 Loop Up	Stall	225 KIAS
Horizontal Line	80 KIAS	225 KIAS
45° Climbing	100 KIAS	225 KIAS
90° Up	Stall	225 KIAS
45° Diving	Stall	225 KIAS
45° Diving	Stall	225 KIAS

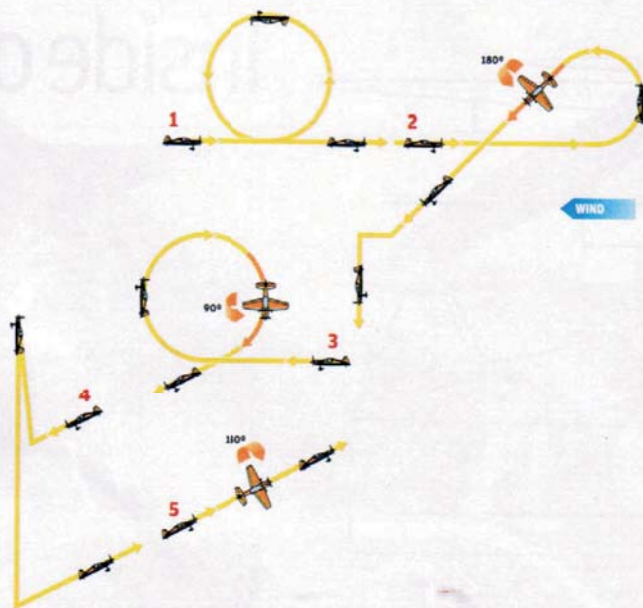
Spin Recovery
 Spin recovery must be initiated when speed characteristics appear or after a maximum of 8 turns:
 1. Reduce power to idle and center stick.
 2. Apply and hold rudder opposite to direction of rotation (hard pedal) until rotation stops.
 3. Return to level flight.

Maximum G-Loads
 Aerobatic: ± 10G / M_{max} 250kg
 Utility: +4 -2.0G / M_{max} 500kg

No Smoking

Critical airspeeds for aerobatic manoeuvres. Best read on the ground

Track notes



● Diagram to the right is the beginner's aerobatic sequence: 1 is a loop, 2 is a half-Cuban (not related to a half-Brazilian), 3 is a quarter cloverleaf, 4 is a stall turn and 5 is an axial roll. For those interested, Goodwin was sick after 5.

ACCELERATION 3deg C, wet

XTREMEAIR SBACH 342

Standing quarter mile 12.7sec at 128.2mph, 30-70mph 3.3sec

30mph	40	50	60	70	80	90	100	110mph	120mph	130mph	140mph	150mph	160mph
2.5s	3.3s	4.1s	4.9	5.8s	6.8s	7.9s	9.0s	10.2s	11.5s	13.0s	14.9s	17.1s	19.1s



ASTON MARTIN DBS

Standing quarter mile 12.8sec at 123.2mph, 30-70mph 3.2sec

30mph	40	50	60	70	80	90	100	110mph	120mph	130mph	140mph	150mph	160mph
1.9s	2.5	3.4s	4.2	5.1s	6.4s	7.5s	8.7s	10.3s	12.0s	14.7s	17.3s	20.3s	26.0s



← a skid. Between your legs is the joystick. Push it left and the left-hand aileron on the wing will flick upwards and the right-hand one will point downwards. That will put us into a left-hand turn. Pull the joystick back and the elevators at the tail will tip upwards and pitch us up into a climb. Forwards and we pitch downwards into a dive. Lastly, there's the throttle. Usually it's a push-pull knob like the choke on an old car, but on the Sbach and other

aerobatic aircraft it's a big handle that slides fore and aft.

In the front we have two instruments on the panel above our legs: an airspeed indicator and altimeter. Both occupants sit on their parachutes and are strapped in by a five-point harness fitted with a ratchet system to tighten the harness to medieval torture levels of tightness. We'll see why shortly. The view out through the canopy is fantastic, which is essential in aerobatics and for general

flying about the place. You don't need a great deal of room in a sports plane, just as you don't in a supercar, but the 342 doesn't feel cramped and there's far more elbow room than in a Caterham.

PERFORMANCE



Cooper has a throttle but also a red mixture knob. As you climb, the air

gets thinner and therefore the engine is taking in less air and will start to run rich. To compensate, you lean the mixture. This really only applies when you're above about 3000ft, so today the engine will be kept at full rich. The unsilenced Lycoming sounds extremely butch. Checks done (engine temperatures and pressures, propeller pitch control, magnetos, control movement) and we're ready to go.

The rear cockpit's rudder pedals incorporate brake pedals – the left pedal operating the left-hand brake disc, the right pedal the right brake. The 342 is a taildragger, which means that it has two main wheels at the front and one small tailwheel (most modern aircraft have a tricycle undercarriage with a nose wheel). Taildraggers are more sexy, but you get a less good view forwards because of the nose, which means that you have to weave when you're taxiing so that you can see obstacles. (In a Spitfire, you can't see anything out front.) The rudder also helps you steer on the ground, but only if there's a decent amount of air flowing over it either from the propeller or from your forward speed through the air.

Cooper has set the propeller pitch to fine (using the blue knob) and we're lined up to go. She's mine. Open the throttle slowly at first because if you whack it open, the torque reaction of the prop will send you off course, as will the propwash flowing down the side of the fuselage. (The prop spins clockwise as you're looking at it from behind, which means most of its slipstream runs along the left-hand side of the fuselage.)

To counteract these forces, you press on the right rudder pedal to keep straight on the runway. Stick forward at about 35mph (30 knots on the airspeed indicator; times knots by 1.15 to get mph) to lift the tail for less drag and a better view, then pull gently back on the stick at 80mph and we're airborne. By light aircraft standards, the acceleration is astounding. By car levels, 0-60mph in

On the limit



Cold, dense winter air means fantastic engine performance and amazing climb rate of at least 2800ft per minute. Sbach has a roll rate of 450deg per second, faster than its rivals.

Carbonfibre/honeycomb construction is super-stiff, which makes for super-accurate control response. Airframe is stressed to +10/-10g but can go beyond that without falling to bits. Not so the pilot.



Although the Sbach is capable of winning at any level, it's not a difficult plane for an average pilot to fly. The biggest lesson is not to over-control, because the stick needs only light pressure for manoeuvres.

Under the skin



Pilot and co-pilot enjoy a Top Gun sunset moment at the Lincolnshire airfield

4.9sec puts it into the very brisk sports car category. But once we're rolling the figures become more impressive; 0-100mph in 8.9sec is the same as an Aston DBS. The numbers compare but the sensation is totally different.

In a car, if you're going too fast you lift off the gas. But it works differently in an aircraft. Pitch controls your speed, so if you're doing 125mph and you want to be at 100mph, you pull back on the stick and the speed will be converted into an increased rate of climb. For more speed you push the nose down – and, of course, you'll descend at the same time. Pull the throttle back and you will start to descend; whack it open and you go up.

RIDE AND HANDLING



Imagine a car with rose-jointed suspension, very stiff springing and a steering rack with less than one turn lock to lock. That's the Sbach 342. Pull back on the stick to reduce the speed a tad and the nose shoots up. Correct and the nose shoots down again, the speed immediately starting to build. Just a bit of pressure on the stick is enough for it to respond. The controls are light, even

when there's a 200mph wind going over the control surfaces – much lighter than a car's controls. Just as in a car, you want the controls to be evenly weighted and balanced.

We take the 342 through a simple aerobatics sequence. First a loop. Nose down 45 degrees, full throttle. Let the speed build to around 230mph. 'Around', because you don't want to be peering too closely at an instrument when stuff on the ground is getting bigger very rapidly. Pull back the stick and suddenly ground is replaced by sky.

See the funny wire things at the end of the wings? They're sights and you use them to judge your angle relative to the horizon. To get a nice, round loop, keep the centre of the sight on a point on the horizon. Keep pulling, then ease off the pressure as the aircraft goes on to its back. You float for a few seconds and, at the same time, look forwards as the fields come back into view.

Pulling out at the bottom, the g-meter reads 7.9g. Even without it, the fact that at the bottom of the loop it feels like there's an elephant sitting on your head and you could lick your own belly button implies that quite a few g were involved.

Now an aileron roll. This is an easy one to do: pitch the nose up about 20 →



TRIED AND TESTED

Many companies and individuals have tried adapting car engines for aircraft use – including Porsche, which converted the 3.2-litre Carrera engine for aircraft – but the results are usually disappointing at best. The Lycoming design goes back over 50 years and it's well proven. This 342 carries a standard engine, but for serious competition pilots will have an engine handbuilt and blueprinted for maximum performance.

The white painted canister that you can see in the bottom photograph is the inverted oil system. The Lycoming is wet sumped, but the inverted system uses valves to allow sustained upside-down flight. The fuel tanks also have flexible fuel pick-ups – called flop tubes – that fall with gravity when the aircraft is inverted so that they're always immersed in fuel.



The six-cylinder Lycoming engine gives the 342 some 980lb ft per tonne



Just like driving a racing car, you need to feel what's going on through the controls.

You don't feel the speed when flying it, but you do when you're low down, approaching an airfield. Or in

a vertical dive and the cows are rapidly getting bigger. Speed limit in private (out of the airways) flying is 287mph, so no problem about getting a ticket.

Big fuel tanks, comfortable cockpit and very stable

ride mean that you can fly to Venice in comfort in under four hours. Pack a credit card and toothbrush only. Legally, it can only be flown in daylight, out of clouds and in sight of the ground.





1 Airspeed indicator (ground speed is different; it depends on wind). Green is fun, yellow is exciting, beyond red is a parachute job.

2 Altimeter is rather important for avoiding aircraft-ground interface. Knob on instrument is to adjust for local air pressure.

3 Red switch arms the ELT – Emergency Locator Transmitter. Tells rescue services where the wreck is. Useful in deserts, though.

4 Manifold pressure indicates engine power (left); rpm gauge (right) shows propeller. Throttle changes power, the blue knob rpm.

5 Fuel selector (left) and gauges for the three fuel tanks. Running out of gas is rather more serious in an aircraft than in a Skoda Yeti.

6 Handheld sat-nav. Useful in a car, wonderful in a plane. Below are radio and transponder – which tells Heathrow where you are.



7 Blue knob at top controls propeller rpm pitch (and by default rpm); red knob is used for adjusting mixture. Very important not to pull this one out full because the engine will stop. Big handle is the throttle.



8 Size 10 foot is on right-hand rudder pedal. Brake bar is under toes. Co-pilot joystick in foreground.

Crunching numbers



ENGINE

Installation Type	Front, longitudinal Horizontally opposed
Made of	Aluminium block and head
Fuel	101LL low lead Avgas
Bore/stroke	135mm/111mm
Compression ratio	8.9:1
Valve gear	2 per cyl
Power	320bhp at 2700rpm
Torque	622lb ft at 2700rpm
Red line	2700rpm
Power to weight	504bhp per tonne
Torque to weight	980lb ft per tonne
Specific output	34bhp per litre

ECONOMY

TEST	Average	na
	Touring	na
	Track	na
CLAIMED	Urban	na
	Extra-urban	na
	Combined	17mpg
Tank size	2 x 105 litres, 74 litres aerobatic tank	
Test range	1092 miles at 10,000ft	

CHASSIS & BODY

Construction	Carbon monocoque
Engine weight	205kg
Airframe weight	430kg
Total weight	635kg
Drag coefficient	na
Wheels	5.5in, alloy
Tyres	500xR5.5 Michelin Aviators
Spare	na

TRANSMISSION

Type	na
Gearbox	na
Propeller	Three-blade hydraulically actuated constant speed, 203cm

WHAT IT COSTS

XTREMEAIR SBACH 342

In-the-air price	£236,450*
Price as tested	£237,610
Value after 3yrs	£236,449
Contract hire pcm	na
Cost per mile	na
Insurance/typical quote	£3000 (est)
Warranty	2yrs/unltd
UK dealers	1

EQUIPMENT CHECKLIST

Steerable tail wheel	■	
Heavy-duty brakes	■	
Wheel/landing gear fairings	■	
Antennae x 3	■	
Gel 12v battery	■	
FILSER radio	■	
FILSER transponder	■	
Emergency locator t'ponder	■	
Many, many sick bags	■	
Sighting device L&R wing	■	£1160
Garmin sat-nav	■	£1863
Leather seats	■	£575
A'batic sequence card holder	■	£75
Stop watch/clock/timer	■	£195
Carbon baggage box	■	£1270
Cockpit heater	■	£1524
Canopy cover	■	£504
Smoke system	■	£4064
External power socket	■	£29
12v power supply	■	£110

Options in **bold** fitted to test aircraft
 ■ = Standard na = not available

RANGE AT A GLANCE

ENGINES	POWER	FROM
9.5-litre	320bhp	£236,450

*All prices converted from euro; according to exchange rate on 6.12.10

ACCELERATION ON TAKE-OFF

MPH	TIME (sec)
0-30	2.5
0-40	3.3
0-50	4.1
0-60	4.9
0-70	5.8
0-80	6.8
0-90	7.9
0-100	9.0
0-110	10.2
0-120	11.5
0-130	13.0
0-140	14.9
0-150	17.1
0-160	19.1
0-170	21.5
0-180	24.4
0-190	27.1
0-200	30.5

ACCELERATION IN DIVE

MPH	Time	Altitude
30-50	0.09sec	(1927ft)
40-60	0.1	
50-70	0.1	
60-80	0.11	
70-90	0.12	
80-100	0.12	
90-110	0.15	
100-120	0.2	
110-130	0.27	
120-140	0.34	
130-150	0.43	
140-160	0.42	
150-170	0.40	
160-180	0.39	
170-190	0.40	
180-200	0.41	(330ft)

SUSPENSION

Right	Steel spring and tube
Left	Steel spring and tube

STEERING

Type	Aileron
Turns lock to lock	na
Turning circle (ground)	0m
Turning circle (vertical)	50m
Turning circle (90deg banked)	100m

BRAKES

Right	Independent hydraulic 220mm disc
Left	Independent hydraulic 220mm disc
Anti-lock	na

SAFETY

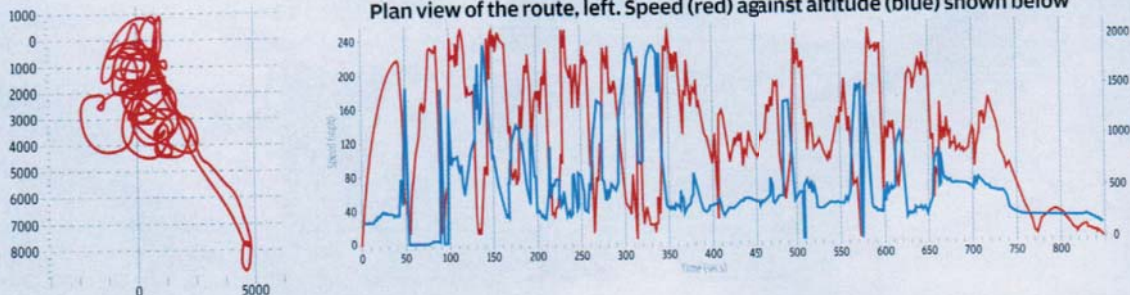
Passenger-mounted parachute > 2

GREEN RATING

CO₂ emissions	A lot
Tax at 20/40% pcm	na



Plan view of the route, left. Speed (red) against altitude (blue) shown below



THE SMALL PRINT *Power and torque-to-weight figures are calculated using manufacturer's claimed kerb weight. Or should that be runway weight? © Autocar 2010. Test results may not be reproduced without editor's written permission. For information on the SBach 342, contact XtrêmeAir GmbH, Harzstrasse 2, Am Flughafen Cochstedt, 39444 Hecklingen, Germany (+49 39267 609990, www.xtremeair.de). For UK sales and flying training, contact Gerald Cooper (07710 442816). Insurance estimate is based on an over-ambitious 40-something male with a clean licence, full no-claims bonus, minimum 250 hours' experience, a strong stomach and an understanding wife. Or no wife. And remember, planes can go down as well as up.

**AUTOCAR
ROAD TEST**

Read all of our road tests
autocar.co.uk

XtremeAir Sbach 342

AUTOCAR VERDICT ★★★★★

The Ariel Atom V8 of the aerobatic world; a new class benchmark



TESTERS' NOTES



COLIN GOODWIN
Most exciting aircraft I've ever flown. Just wish there was less of a talent shortfall.



MATT PRIOR
Wingspan makes parking in a conventional garage an issue. I've got Microsoft Flight Sim, but they wouldn't let me fly it.



VICKY PARROTT
Couldn't believe how brilliant it looks. Paint is from a Focus ST. Watching Cooper fly upside down 30ft above the runway was dramatic.

JOBS FOR THE FACELIFT

- Improve fuel economy.
- Make it cheaper.
- Include free pilot training.
- Make sick bag standard.

+degrees and then throw the stick to the left or right, depending on which way you fancy rotating. To finesse the move, you use the rudder pedals to dial out yaw and a bit of forward stick when you're upside down. It's easy to do in an old-fashioned aerobatic aircraft, but this plane rolls at a rate of 450 degrees per second. That's terrifyingly fast and doesn't give much time for thinking.

Now a stall turn. Pull vertical from about 200mph and the airspeed starts to disappear. Soon we're hanging in the air with that monster prop spinning above us. Stick hard across to a rough two o'clock position and kick the left rudder pedal. The 342 turns in its own length and points directly at the ground. At that point we're doing under 50mph. Seconds later, at the bottom of the vertical dive, we're doing well over 200mph. More gut-wrenching g.

But nothing compares to a few seconds of Cooper demonstrating what the 342 can do. In the hands of one of the best pilots in the world, the aeroplane defies belief and physics. Tumbling, rolling, stopping in mid-air upside down. But, most amazing of all, flying inverted along the runway at about 30ft at over 150mph.

BUYING AND OWNING

★★★★★

Without options, the Sbach 342 costs £279,000 (£236,450). Expensive, but a Ford Focus WRC will cost around £750,000. The beauty of the Sbach is that not only do aircraft hold their value far better than cars, but the 342 is also a very usable aircraft. There are three fuel tanks: one 105-litre tank in each wing root (which must be empty for full-on aerobatics) and a 74-litre tank in the nose for aerobatics. Fill all three and you have a range of 1100 miles at 230mph (cruising at 10,000ft). There's even a little luggage area behind the rear seat for a soft bag.

Cooper has already sold three aircraft to city lads who fancy injecting some serious excitement into their lives.

Of course, it would be a total waste of the Sbach 342 to use it for visiting different airfields for cups of tea, which is what the majority of private pilots spend the majority of the time doing. It makes for an expensive cup of char. The beauty of this aeroplane is that it can do that job and win at the highest level of aerobatic competition. Andy Green, the world's fastest man and ex-Tornado pilot, flew the single-seat Sbach in the summer and was so excited that he could barely speak. It gives a level of handling that jet fighter pilots can only dream of.

The beauty of flying is that there are few rules. You can't fly near Heathrow or over RAF bases or in other restricted areas, but in uncontrolled airspace you can pretty much do what you want. The Sbach would never be a substitute for a sports car, just literally an extra dimension in which to have fun.



MAKE	XTREMEAIR
Model	Sbach 342
Price	£236,450
Power	320bhp at 2700rpm
Torque	622lb ft at 2700rpm
0-60mph	4.9sec
Top speed (claimed)	253mph
Fuel economy (combined)	17.0mpg
Kerb weight (claimed)	635kg
CO ₂ /tax band	Lots/0 per cent

A new benchmark for two-seat stunt planes. Unbeatable.
★★★★★

MAKE	XTRA
Model	330 LC Stunt Plane
Price	£210,000
Power	315bhp at 2700rpm
Torque	612lb ft at 2700rpm
0-60mph	na
Top speed (claimed)	253mph
Fuel economy (combined)	na
Kerb weight (claimed)	660kg
CO ₂ /tax band	na

The XtremeAir's closest rival. Like last year's F1 car, it's been overtaken.
★★★★☆

MAKE	FORD
Model	Focus 2010 WRC car
Price	£750,000 (est)
Power	300bhp at 6000rpm
Torque	406lb ft at 4000rpm
0-60mph	3.6sec
Top speed (claimed)	127mph
Fuel economy (combined)	na
Kerb weight (claimed)	1230kg
CO ₂ /tax band	na

Very quick, but not cheap. Can fly if given a crest and a run-up.
★★★★☆

MAKE	PITTS
Model	Special S-2C
Price	na
Power	260bhp at 2700rpm
Torque	505lb ft at 2700rpm
0-60mph	na
Top speed (claimed)	194mph
Fuel economy (combined)	52.3mpg
Kerb weight (claimed)	552kg
CO ₂ /tax band	na

A true classic, but not as manoeuvrable as the most modern rivals.
★★★★☆

MAKE	JOHANN
Model	S. Bach
Price	Not for sale
Power	0.3bhp
Torque	na
0-60mph	95c (est, to 13mph)
Top speed (claimed)	13mph (est)
Fuel economy (combined)	750cl wine/3 meals per day
Kerb weight (claimed)	95kg (est)
CO ₂ /tax band	0g/km, 0 per cent

Makes a good noise given the right equipment, but lacks practicality.
★★★★☆

Verdict on every new car p138