



FLIGHT TEST | Waco OEC

Thirties Style

When the style in which you travel is more important than the act of arrival, this 1930s gem is a transport of delight

WORDS Mark Hales PHOTOGRAPHY Ed Hicks

“People talk about the rumble – it’s something you feel as well as hear, a gentle bass drumbeat throbbing through the airframe”



Enough has been written about the romance of the radial experience, usually accompanied by pictures showing clouds of smoke billowing from a waking engine, for us to believe it’s likely to be different. Since most of us seek the glorious ambience of flight rather than a practical means of transport, well, something different should be a pleasure worth seeking.

If first impressions are anything to go by, the 1932 WACO Model ‘C’ cabin biplane parked on the grass at Enstone’s northern end promises more of everything. Recently completed by Enstone-based Boeing Stearman expert Tom Gilbert and assistants Tony Bird and Franco Tambascia, it’s the only one in the world, now owned by Mycroft Perry – whose business card says he’s ‘The Happy Farmer’ (with over 98 hours in his logbook), and former RAF QFI turned airline pilot David Keays (17,500 hours and counting, who’s currently with Thomson).

Sometimes you wonder how something so large as a WACO not only survived, to be restored in an age where space is at such premium, but did so at such a leisurely pace. NC12467’s logs showed a total of 896 hours when it was stored for the second time in America during 1986, then in 2012 – we assume as a consequence of probate – it was exported to Germany, where a Porsche restoration expert by the name of Schumacher began a restoration which for whatever reason, he chose not to finish. That was completed by Gilbert in 2016, after a great deal of head-scratching.

“They’d done a lot of work, and it was good,” he says, “but there was nothing for the engine installation, or the cabin. And there was an awful lot of rubbing down and tidying up, and painting.” The old chestnut of 90% done, 90% still to do.

Pug-nosed

The aircraft sits tall on long legs, which seem too close to the front, an impression accentuated by the pug-nosed engine installation that looks as if it’s been borrowed from something larger, only partly-shrouded by the aluminium Speedring, intended to reduce drag and direct air round the cylinders.

Get closer, look past the blunt lines and see the detail. The red-and-silver Randolph finish is matt rather than gloss so you can just about make out the weave of the fabric. ▶



Above There’s a good view up and around – roof glazing lights up the cabin
Top right Throw-over column has chain drive to the aileron cables down below
Left Proud owners, Mycroft Perry (left) and David Keays
Bottom Parked, door open, the WACO invites you to climb onboard and experience some thirties magic



That and the neat lines of tape and careful detailing are obvious to the inexpert eye, yet speak of labour-intensive craftsmanship, even when you have little idea of the techniques involved. The result is most likely how it looked when it rolled from the factory in Troy, Ohio, 85 years ago and is an essential part of the aeroplane's period appearance. Modern, two-pack paint which fills all the gaps isn't the way it was.

WACO began designing cabin aircraft in 1931, to supplement its already considerable range of open-cockpit biplanes, and the OEC – to give the model its full, original name – was one of three built the following year. The quirks of WACO type numbering could fill the page but the 'O' denotes the original, 210hp, five-cylinder Kinner engine, which by all accounts wasn't very smooth. The following year saw WACO introduce the option of an essentially similar aircraft, equipped with a 220hp, seven-cylinder Continental and designated UEC – the 'U' for Continental – of which over forty were built. A snip at just \$5,885 plus options, or about \$105,000 and £80,000 in today's money. Actually, that's cheap when you compare it with a Rotax-powered machine... WACO was apparently happy to accommodate its customers' individual requirements and redesignate accordingly, but having first been put into storage in 1943, NC12467 was converted to Continental power in the early fifties, although for some reason the aircraft didn't fly again until 1960.

Sense of antiquity

The construction is conventional for the time with a steel-tube fuselage covered with fabric, and wooden wings, the lower one narrower than the top. Tom Gilbert says the wing "looked delicate" inside, with no diagonal braces and a lot of small pieces of wood to shape the ribs, but that was also the technology of the time.

It's curious though, that there's so little technical information on the aircraft. Keays says the FAA type certificate is a "ten-line document" and that, despite hours of research, no data could be found on C of G position, rigging, pilot operation, or anything.

"There was, for 1933, nothing for this model," he says, "and I thought long and hard about how I was going to fly it. As you will see though, there was nothing to worry about."

Such mystery only adds to the sense of antiquity, but history and appearance so inextricably entwined are one thing. The other essential is the nature of the flying experience. This is a living restoration, not a museum piece. It's a bit like cars, where a basic 1.2-litre economy model will get you there just as effectively as a Rolls-Royce Phantom, but it's the ambience in which you travel that makes the difference. That very much applies to flying an old aeroplane, except that the air is much the same as it was eighty years ago, whereas the roads have changed out of all recognition. Flying something like the WACO is nothing like trying to use an old car on a modern piece of road. There's a lot of essential ritual on the ground as well, most of it necessary to manage unautomated vintage technology, and all of it enjoyable because it's part of the experience.

Assuming someone has pulled the engine through, to clear any oil which might have dribbled down to pool above the pistons, the experience begins with entry to the cabin via

a single door aft of the lower port wing. The aircraft sits at a very steep angle, which is necessary for the huge wooden Sensenich propeller to clear the ground. But because the door is at the back, you step easily in to a lounge area with a high ceiling, shuffle up the gradient towards the front with only your head bent, slip between the seats and sit down.

Only as my gaze transfers to where I might go, do I realise that the spacious cabin, flooded with light from its greenhouse glazing, has little or no forward view. The taildown angle would see to that, even if the lookout weren't filled by cylinders and the elegant ring which circles them. The seats are very close to the cabin wall and the squab is narrow so there's only half a leg's-worth of support on the inside. I forget that very quickly, intoxicated by an aromatic mix of leather, dope, avgas and oil...

The large burr walnut panel, which is a clever paint effect on the original aluminium, has familiar dials, and there's a throw-over column with a large, round steering-wheel which wasn't. A long way back from the firewall are the rudder pedals, sticking up vertically from the floor, with large, rocking brake plates at the top edge, operating a set of modern discs from a Beechcraft Baron or the like.

Having grappled with vintage aircraft brakes more times than I'd like over the years, that's one piece of originality I definitely don't care about... My oversized feet need to have their heels well back, though, and I do feel as if everything is bent more than it needs to be, given the size of the cabin. Sure, you could adjust a few things to suit, if it was yours.

However, it isn't every day that you can sit in an aeroplane with an arm resting on walnut with wind-down windows on both sides, one of which gives a perfect view between a pair of widely-spaced wings joined by substantial struts – there are no flying wires. Each wing is equipped with a metal aileron, the top example operated by cables in the wing and linked to the bottom one by a sharply angled strut.

About the rumble

David has kindly allowed me reign of the left seat, while he reads out a checklist on his phone. That's a good thing when things are different. Fuel sight gauges for the two 25-gallon wing tanks hang down each side of the cockpit – and there's an optional 16-gallon tank in the lower starboard wing, making a total of 66 gallons. That's more than enough to go places.

Mixture knob pulled out for rich... David says that somewhere in the 24,000 drawings which he has, for every conceivable part on almost every WACO, there's a bellerank to reverse that. Prime, hot or cold, but don't pump when the engine isn't running. The accelerator pump in the carburettor will squirt fuel into the airbox underneath the engine, rather than up into the cylinders, and when – not if – the engine coughs, the fuel can catch fire. David says he's already primed, so we don't have to. Perch the feet on top of the brake pedals and push – there's no handbrake – press the starter and allow it to get the engine up to speed. That's a procedure to stop the engine kicking back. The Continental displaces 668 cubic inches, or eleven litres, and it has a lot of internal mass.

People talk about the rumble, and I still can't think of a better word. It's something you feel as well as hear and it sends a gentle bass drumbeat through the airframe at a



Above The view from the back seat is better than from the front. David Keays shows how it's done...

Right Steps are essential for refuelling and the total capacity is a generous 66 gallons

Bottom right The overstamped model type indicates the change from OEC to UEC engine spec

Below Outdoor plumbing – fuel pipes route outside the airframe and the sight gauge is easily visible through the wind-down window

Left The WACO's interplane struts are substantial, and pitot/static connections add a little extra drag





Top Floating in ground effect, feeling for the ground. There are oleos in the bottom of the legs – absorb one hit, then reset when you take off again

Above The leather-clad lounge area has plenty of space for four plus luggage in the back

Left Hales (right) and David Keays check the aileron movement

frequency which is reassuring rather than trying. And like a lot of things about the WACO, it doesn't change much from the moment you start until the moment you shut down.

Set about 800rpm, which keeps the engine happy and is enough to make the 8.50 section tyres roll on grass. The tailwheel is steerable and, mostly, the aircraft responds, helped occasionally by a touch of brake. But it's essential to either have someone in the other seat, calling out what they can see, or you weave theatrically, and much more than you think you need. From the left-hand seat, nothing is visible to the right until you get over to the window on that side, making very easy to clatter into something.

Magic carpet

Line up, windows closed, oil warm, pressure good, fuel tap on 'both', waggle the tailwheel and lock via the lever on the right of the seat, check the magnetos, and the trim – although I never felt it made much difference. Then make sure that the heels are far enough back to be really uncomfortable and push the plunger.

The surge is surprising and much more than you'd expect for an aircraft of its size (and a gross of 2,700lb) powered by an engine of 220hp, but the Continental is able to swing a 98in propeller because a radial develops more torque at lower rpm and a bigger prop rotating slowly is more efficient than a small one turning fast.

David had said that there was no need to lift the tail and with my gaze firmly fixed along the edge of the runway, and barely any footwork, the WACO wafts into the sky with such ease, which comes as another surprise. It doesn't take off, it rises underneath you like some magic carpet, levitating in an almost level attitude then settling at a surprising rate, at something like 800fpm at 80mph, exuding an aroma of hot metal with a hint of unburnt oil.

Meanwhile, the gauge says about 1,800rpm but the noise and the drumbeat isn't any different, it's just that something

has turned up the volume a bit. All the things you expect have been realigned... talking of which, I realise that the ball is out to the left and the wings are dipping to starboard, but it hardly seems to matter. Push a pedal, or try, because it barely seems to move although the ball does oblige by returning to the centre, but the wing doesn't come up.

Because there's a wheel, it isn't immediately obvious whether it's turned, but steer it left. Feels heavy and high geared but up comes the wing. Pull back on the power to maintain 1,800rpm and settle at about 90mph, which seems fast but apparently isn't. The ones in the States equipped with metal propellers of a coarser pitch rumble along at about 115mph.

The excitement of take-off having proved pleasantly absent, I can relax a little and allow the ambience to permeate. There's a curious floating sensation like a leaf in a gentle breeze, and at first I'm tempted to chase it with little movements of the wheel and prodding of the pedals. Then I relax and just let it fly.

Waft is definitely the word. Should you want it to lean on a wing, just give the pedal a good prod and heave the wheel, but it always responds in a reassuringly stately manner. It stalls like that too. I heave the column way back into my chest and wait while the WACO rocks gently from side to side, mushing downwards with about 40mph on the dial. Eventually, there was just a hint of a wing-drop but you couldn't possibly ignore the build-up.

Delightfully easy

And so, after a pleasant half-hour of rumble and float, gazing through the ample glazing at a green and pleasant land, it's time to look for some more potential excitement. The approach to Enstone's northern grass Runway 26 is over hangars, which you can't see, looking for an eventual leg which I know is long, with a tail that's definitely low. David suggests a practice run at 1,500ft, setting it up for 55mph, which is the approach speed.

"Find the power that will hold it," he says, "and that will do nicely for the landing." That turns out to be about 1,200rpm, and I run through the checks as David reads from his mobile. Fuel on 'both', mixture 'out', carb heat 'out', no flaps, eyeball the multiple curves of the hangars... 55mph feels awfully slow, but I must remember to hold the nose up so it doesn't increase – still can't get the trim to take the load.

Give the buildings, which have disappeared from sight, a bit too much clearance, look along the cowl and feel for the ground. There's a gentle brush, and the WACO rises gracefully back into the air. Must have let the speed increase. A small touch of power and it settles smoothly on to the grass. Despite the long landing and the bounce, a little brake ensures we've only used half the runway.

My second attempt later on is a bit better, but I'm still a couple of mph too fast and instead of bouncing, we skim the grass for a bit, working the pedals against the breeze which has sprung up. But it's delightfully easy – slightly intimidating because of the lack of vision, but utterly benign in practice. Next time I'll have the confidence to slow it down further and sit the wings on the cushion of ground effect.

During a pleasant flight back to the north, I mused idly about the day's events and the red-and-silver biplane that had brought it all about. When new, the WACO may have been considered expensive, but in today's money, if you compare that with a new Piper or Cessna four-seater it's still good value. After all, it isn't the act of arriving that's important, it's the manner in which you travel... 



TECH SPECS

WACO OEC

Finest 1930s cabin wafting

MOTOR MAKE		MAKING	MOTOR NO.	141	D. C. LICENSE NO.	H020467	MODEL	OEC				
EQUIPMENT		MAKE	NUMBER	PAINT SPECIFICATIONS (Give number of coats)								
Carburetor	Stromberg	5055475	Color Titanium					varn	silver	varn	varn	silver
Magneto-Left	Scintilla	117531	Clear Depe					"	7	4	7	7
Magneto-Right	"	101855	Red Brown					"	"	"	"	"
Starter	Haywood	1440	Aluminum					"	2	2	2	2
Prop. (Metal)	Hamilton	19558	Pigmented					"	3	3	3	3
Prop. (Wood)	"	"	Lacquer					"	"	"	"	"
Prop. Design No.	"	"	Primer Berry Bros. 1 ROK					1 ROK	1 ROK	1 ROK	1 ROK	1 ROK
Prop. Hub (if metal)	"	"	1 coat Duco enamel on fuselage frame					Note fully below of extra equipment such as streamline fairing, special cowling and rings, and all changes of any nature from standard design.				
Shock Struts	Waco	"	10 gallon tank in right lower wing; new					soft cushions; new style front seats; 20 gal. tank in lower right hand baggage compartment lid; new style rear seat; new style wood side frames; gas pump on right side of firewall; 5 gal. oil tank; cover over fuel compartment; new style exhaust pipe with titanium tube; two 1/2" x 1/2" inch oil seals				
Tachometer	Pioneer	3476297	WHEEL TIRE AND BRAKE EQUIPMENT					SIZE MAKE TYPE				
Altimeter	Consolidated	"	WHEELS					650-10	Air. Prod.			
Compass	Pioneer	"	TIRES					650-10	Pirestone			
Oil Press.	"	"	BRAKES					650-10	Air. Prod.			
Oil Temp.	"	"	Date Completed					5-25-32				
Air Speed	"	"	C 389									
Air Speed	"	"	3544597									
Ignition Switch	Scintilla	"										
Bank & Turn	"	"										
Rate of Climb	"	"										
Lock	"	"										

Original bill of sale records for the 1930 model change

Performance

- Max speed** 115kt
- Cruise speed** 100kt
- Stall speed** 42kt
- Rate of Climb** 800fpm
- Range** 500nm with reserve
- Fuel burn** 12gph

Weights & loading

- Seats** four
- Max take-off** 2,700lb
- Empty** 1,750lb
- Payload** 950lb
- Baggage** 57lb
- Fuel capacity** 66g

Dimensions

- Wingspan** 32ft 2in upper, 28ft 2in lower
- Wing area** 245sq ft
- Length** 24ft 8in
- Height** 8ft 6in

Spec

- Airframe** Steel tube, wood, fabric
- Engine** Continental W-670, seven-cylinder radial
- Max power** 220hp
- Prop** two-blade Sensenich, wood
- Avionics** TRIG, but hidden away...
- Undercarriage** Taildragger, with Cleveland disc brake upgrade

Manufacturer

WACO Aircraft Company
Troy, Ohio, USA
www.nationalwacoclub.com

Price

\$5,885 plus options when new, in 1932. This example isn't for sale, but you should expect to pay upwards of \$150,000 if you find a restored example of the similar UEC that an owner might consider parting with...



Left Should you want it to lean on a wing, just give the pedal a good prod and heave the wheel