





The Beechcraft Baron



Justin Cox flies a pilot's aircraft – a Rolls-Royce of the GA world – but this robust twin

has its peculiarities and is not necessarily the engineer's favourite

The venerable Beechcraft Baron Model E55 is still held in high regard by many pilots. Those that have flown one, and even those that haven't, conclude that a Beechcraft is about quality – and the Baron is known as the Rolls-Royce of light twins.

As a pilot, I enjoy every flight at the controls of a Baron or Bonanza; they are fast, have a good, solid feel and are definitely a pilot's aircraft. As an engineer, I have different feelings. I would go as far as to say that the Bonanza/Baron types have one of the largest divides there is in the field of light aircraft between the engineers' and the pilots' regard for them. Engineers often don't share the same Rolls-Royce opinion as pilots, and I've seen rivet holes without rivets and poor skin joints, amongst other things. Still, these quality questions never seem to take away the fact that these machines fly well.

The Baron has some peculiar design features, especially regarding the wing. The leading-edge and the rear portion of the wings attach to the spar by a piano hinge, just as the one found on the rear baggage door. Another strange feature is that the wings are attached each side to the fuselage by four bolts that act in tension. Bolts, like rivets, are not made to work in tension, so this design practice is used by only a handful of aircraft. For this reason the wing bolts are of a

ridiculously large size, and require crack-testing every five years and renewing every 15. What's more, new nuts need to be fitted every time they are disturbed, which is not a cheap exercise, but beyond holding the wing on they have a practical application. The lower forward wing-attach bolt forms a pivot point for setting the incidence of the wings, the other bolts enabling the wing to be rotated around the lower forward bolt, in practice meaning that any wing-low tendency can be removed by adjusting the incidence of the whole wing.

Despite the age of the design, the Baron still looks very business class and ready for a mission. The impression of the machine's strength and speed when sat on the ramp are enhanced by its streamlined cowls, squat, strong-looking gear and its sleek fuselage. First impressions can be misleading, but not for the Baron which manages to amply live up to its first impressions, and in some cases exceed all expectations. That said, all light twins (as do most light aircraft) suffer from payload issues; if you fill the tanks and fill the seats you are probably way overweight. The Baron will happily haul its overloaded hulk into the air until an engine fails, and then the story will have a not so happy ending.

Entry is up the right-hand wing-root, by a simple, non-retracting, fixed footstep, which is

surprising for such a fast machine. Entry is a little awkward into the front seats as they are very upright and the footwell appears cramped. Just like the smaller Pipers, all the passengers need to enter through the front access door, meaning the pilot needs to be the penultimate one in followed by the co-pilot. Closing the door either requires close supervision of the front seat occupant or leaning across them to ensure the door is shut properly. The door stay always causes confusion; the door needs to be pushed slightly more open and the stay is manually released from the slot to allow the door to close. The door is slammed shut with a positive feel and is finally secured by rotating the handle anticlockwise to engage the peripheral latches. It must be ensured that the top catch is properly engaged due to the door curving into the roof and slightly round towards the windscreen. In flight, if not latched, the door top is sucked open and becomes a very effective air scoop, bending the door out more and more as you accelerate; I experienced this after departing IFR from Inverness, choosing to return rather than try and close the door in flight.

The fuselage is a narrow 42in, helping cut drag on this speedy machine; it gives 4in to the Piper Aerostar and a massive 7in when compared to the more sedate Piper Seneca,



In our view, probably the best-looking piston twin around



Older Barons have the non-standard power quadrant arrangement, reversing props and throttle

making for a snug feel. If six seats are fitted, access to the rear seats is awkward but can be gained via the baggage door due to the lack of aisle in the narrow fuselage. This is not particularly practical, but will be fine for children or the more agile. In all marques, the rear two seats suffer from reduced shoulder room due to the rapid tapering of the already narrow fuselage in this area. In four-seat configuration, the rear door allows entry to a very generous baggage area complementing the nose locker which is capable of holding a massive 300lb, making for an ideal family touring machine.

Fully loaded, BN can carry a typical family consisting of a 200lb man with a 150lb wife, two 100lb children complete with 150lb of baggage in the nose locker and a further 120lb in the aft baggage area (this is a lot of luggage for four people, equivalent to five large suitcases by normal airline standards). This allows full tanks totalling 515 litres, which at an average burn of 90lph and allowing for a 45min divert, gives a massive five hours endurance at around 180kt. Equivalent to 900nm in still air.

The longer Baron 58 has the advantage of double rear doors that open directly into the rear club seating. A side table opposite the doors, a factory option, makes for a very comfortable and social area for the four passengers in the rear.

Beechcraft eccentricities

Back in the 55, the very upright seating position becomes very apparent, which personally suits my frame with very generous headroom. View over the typically high American coaming is very good, and thanks to the narrow fuselage, a clear view around to almost the tailplane is possible.

“Both engines rotate the same way on the Baron in the traditional American sense, meaning the left engine is the critical engine”

BN is a 1973 model and was originally fitted with lap belts only, since wisely being retrofitted non-inertia shoulder harnesses.

Once strapped in, I familiarise myself with the position of the various switches and controls. This aircraft has had a real facelift, losing the light foundation-coloured tan panel and burr walnut effect for a more modern feeling, a light grey. The instrument panel is very modular, which consequently has limitations. The avionics stack is forced to be offset right of centre by the high set engine quadrant. Fortunately, the stack is unusually deep, and is enough to accommodate most avionic wishes, although if radar is fitted a radio usually gets liberated to the passenger glove box, entailing reaching across the passenger to operate. Not ideal.

Unless specifically requested, the Baron was fitted with an old style throw over yoke, which actually works very well giving good clear free space in front of the P2 seat occupant. Unfortunately, Beech's solution to fitting a dual yoke was to fit a huge T-bar which looks large enough to hold the wings on, obscuring most of

the switches that need to be accessed, and requires ducking about to identify the switch you are looking for. Dual control Baron pilots develop a technique of reaching over or under the T-bar when carrying out various cockpit duties.

More Beechcraft eccentricities are found in the Baron's cockpit. Probably the cause of many a Baron incident is the order of the engine control levers – viewing left to right: prop, throttle, mixture. The throttles are taller than the prop and mixture levers, and are set uncomfortably high on the quadrant. The problem comes when setting climb power. Twin pilots will instinctively set the manifold pressure and then naturally move their hand to the right to set the prop rpm. If the cockpit workload is high, they will continue to pull the 'props' back, anticipating a response, which has been known to result in a double engine failure as the mixtures are pulled back too lean. That said, I personally have never found this departure from tradition a problem.

Probably the cause of more wheels-up landings is the positioning of the gear and flap switches. The gear-shaped tactile switch is situated to the right of the control tube, which is of course obscured by the T-bar, necessitating reaching under and around to operate. The flap-shaped switch is positioned to the left of the control tube, easily accessible, and in what would be a normal position for the gear switch. Be warned!

The latest incarnation of the Baron, the flat-screened glass Garmin G1000 G58, has a non-modular panel which has thankfully had the T-bar replaced with traditional individual controls. Also a low-set traditional engine quadrant has been fitted along with repositioning the gear and

flap switches to more logical locations, making for a very clean uncluttered panel.

Having flown many more hours in Baron 58s, the 55 is a slightly quirky beast; it is a very familiar cockpit, but there are operational differences. The fuel system is a complex four tanks compared to the 58's two, complete with selectable aux main fuel gauge switch to display the desired tank on the singular respective fuel gauges – another recipe for an incident. The fuel cocks are positioned on the floor between the front seats in the same location as the 58, but they sit higher. The placarding is clear and thankfully lacks ambiguity. The other quirk is the cowl flaps, which are electrically operated, unlike the manual ones on the 58.

BN is equipped with IO470 Continentals, so starting is easier than Lycoming-injected engines, not requiring the mixture dance. Continentals are started with the mixture rich. The captain's left-hand side wall contains the magneto switches, neatly stacked and easily accessible, of the permanent non-key types favoured by Beech, with the OAT probe above. The alternator switches are forward of the contoured trim around the OAT with a keyed master switch below and in front of the mag switches. Low on the side wall is the oxygen control panel, which is marked 'inop' as the bottle has been removed.

It was brought to my attention that the ASI in BN is still wearing its old markings for blue line and red line speed, despite being equipped with vortex generators. In my opinion a true safety enhancer on a twin-engine dropping the red line minimum control speed, Vmca, to the clean stall speed of 70kt. Vmca is the minimum speed at which the rudder can meet the induced yaw from the live engine, with one engine shut down. Vmca is possibly the most critical speed for any twin engine; below this speed if you are airborne and have an engine failure, particularly in the safety-critical, take-off and climbout phase, the aircraft will roll inverted with undesirable

A brief history

THE BARON'S ROOTS are not as easy to trace as one might imagine, but can be directly linked with the now 65-year-old iconic Bonanza design. The twin Bonanza, first flown in 1949, causes confusion in the lineage as it is not a true derivative of the Bonanza, despite using some of the single-engine tooling. The waters are further muddied by the military purchasing 216 Model 50 twin Bonanzas and calling it the L-23 Seminole!

The Baron is a direct descendant of the Model 95 Beech 'Badger', produced to be a direct competitor with the Cessna 310 and Piper Apache, being frugally engined with two four-cylinder 180hp Lycoming engines. Due to complaints from the US Air Force that the Badger name had already been assigned to a Soviet Bomber, it was later renamed the Travel Air harping back to the formative years of Beechcraft. The Travel Air is a curious looking aircraft; the front half is definitely Baron, but the empennage looks very dated and completely out of place, being borrowed from the T34 Mentor, the US Air Force military tandem training version of the Bonanza.

The Baron finally morphed out of the Travel Air by replacing the tail with the more streamlined and aesthetically pleasing one from the Beech Debonair/Bonanza and by the addition of larger, six-cylinder Continental engines nestled below more streamlined cowls. The Baron 55 was born. The marque was changed by the addition of more powerful engines (one marque used Lycomings), finally being stretched in 1969 and renamed the Baron 58 with the addition of double, rear-entry doors into rear club seating and a raised gross weight. Larger engined 55s and 58s are given away by an air intake scoop on the top of the cowlings.

consequences. Vortex generators on BN are placed only on the left side of the fin to counteract failure of the critical engine. Both engines rotate the same way on the Baron in the traditional American sense, meaning the left engine is the critical engine. The right engine creates the most yaw due to the direction of rotation of the propeller. Micro VGs offers an upgrade kit for the Baron with vortex generators on both sides of the fin, complete with cowling stakes helping keep the airflow attached around the cowls during high-angle-of-attack flight. I am a big fan of vortex generators, which for many aircraft transform their handling often from sloppy controls into crisp and responsive craft.

Reviewing the speed from the flight manual supplement, I mentally note to adjust the approach speeds accordingly, down from 95kt to 81kt, which potentially is a lot of runway saved on landing.

Feisty performance

Take-off roll is busy and brisk with the expected right boot needed to maintain the centreline. As with most VG or STOL-equipped aircraft, the Baron levitates off the ground before the pilot consciously rotates. With BN's minimum control speed being the same as the stall, there is a simplified thought process during the take-off roll. Engine failure while still on the ground means closing the throttles and stopping on the runway; once airborne and not sufficient runway left, it is a case that the aircraft is already flying so Vmca has already been achieved, so best rate of climb, blue line speed, is then of concern for obstacle clearance. The Baron further simplifies the thought process by having the same max take-off and landing weight of 2,313kg (5,100lb), meaning that fuel doesn't need to be burnt off and a quick circuit and landing can be carried out. In fact, Beech has been a little canny on its max ramp weight, allowing another 211lb (9.5kg) over the max take-off weight, which cleverly equates to normal warm-up and taxi fuel.



You can see more photos from this flight test on the iPad edition of *FLYER* and on the Editorial Extras section of the *FLYER* forum at forums.flyer.co.uk

There are only two on board for the flight test and about half fuel, which I estimated to be about 500lb under mtow, making for quite lively performance. As expected, climb figures are well towards the 2,000fpm at this light weight, but past experience of the 58 is that it will happily climb at the lower levels in excess of 1,500fpm at max weight; I suspect the smaller sibling has similar feisty performance.

Quickly catching the camera ship and forming at just over 100kt was easier than expected, considering the performance difference. No doubt the VGs helped, but the Baron was solid and very easy to keep in formation with no hint of sloppiness through the controls. A true delight.

Photo session complete, I broke away for some high speed assessment. We were light, so speed and fuel burns need to be factored, but settled and trimmed hands-off at 23 square, the leaned fuel flows were indicating 5psi aside, which according to the flight manual equates to 11 usg (42 litres) burn per engine. This gave an indicated 175kt, which at low level on the day of test tried out at 180kt. Airborne Services, the owner and operator, advised me that it works on an average of 90lph for a TAS of 180kt, which appears to be an entirely reasonable figure.

Slowing for a clean stall, easing the throttles back to be kind to the engines, the speed change is very noticeable in the attitude change of the ship, with the stall-warner sounding at 90kt, followed by very noticeable buffet at 83kt with the full stall at 80kt indicated. Combinations of gear and flap had little effect on the stall warning, but the stall speed full-flap and gear down arrived at a very useful 66kt, with very clear warnings with rhythmic nodding at 67kt. The actions of a very civilised aircraft. Expected trim changes are experienced with flap deployment; gear deployment is swift, sub 5 seconds, and has a very distinctive scream of the electrically-driven gearbox, which lives under the pilots' seats. Trim change is minimal, but for such a stubby gear, the drag is very noticeable. Barons are slippery beasts and will happily highlight a poorly-planned

descent. Lower serial #'s have a lower gear speed, but even despite BN's higher gear deployment speed of 153kt, if the descent is executed being kind to the engines, a few tricks are needed up the sleeve for dissipating energy to get below the gear speed – typically deployment of the cowl flaps helps followed by briefly holding altitude or by pitching the nose up briefly to get the gear out, once out the speed is easily checked.

Landing is really a formality with the Baron as long as the speed has been kept in check. This is especially true with VG-equipped Barons, the original ASI will encourage you to carry too much speed, and the machine will float for an embarrassingly long distance requiring torturing of the wheels and brakes on shorter runways when touchdown finally occurs.

Most pilots who have had the pleasure of flying the Bonanza and Baron marques will be fond of their handling qualities, and will all probably agree that it is a pilot's aircraft. They are as strong and as solid as they feel, being stressed to +4.4g and a curious -3.0g, with a very robust landing-gear, which once properly rigged gives very little trouble. They are a good solid instrument flying platform, but a travelling machine of this calibre cries out for a working autopilot. Passenger comfort is not as bad as one might think in the skinny fuselage. The club seating of the 58 is very social, but is usually marred by draughty door seals on the convenient double rear entry doors.

Maintenance costs, as with all twins, is several notches above single-engine prices. They are not the easiest aircraft to work on, which considering the age of the design with little changes since its introduction, is hardly surprising. Parts are generally expensive and may well become more difficult due to the recently notified bankruptcy of Hawker Beechcraft, but there are many Beechcraft owners' and pilots' organisations.

Of course, in times of expensive fuel, twin flying is getting less and less desirable, but if you have a mission for a twin, the Baron is probably as good as it gets for personal light piston transport. ■

TECH SPEC

Baron 55



■ DIMENSIONS

Wingspan	.....37ft 10in/11.53m
Length	..... 28ft/8.53m
Height	..... 9ft 7in/2.92m
Wing area	..... 199.2sq ft/18.50sq m

■ WEIGHTS & LOADING

Empty weight	.....3,236lb/1,468kg
mauw	..... 5,100lb/2,313kg
Fuel	..... 100-136g/455-618ltt

■ PERFORMANCE

Max speed	.....201kt/231mph
Cruise	..... 184kt/212mph
Ceiling	.....19,300ft/5,883m
Take-off to 50ft	.....2,154ft/656.5m
Landing from 50ft	.....2,148ft/655m
Max climb	.....1,693fpm/8.6mps
Range	..... 739nm

■ COST

\$150,000 – \$200,000

■ ENGINE

2 x Continental IO-470-L 260hp

■ SEATING

4-6

■ CONTACT DETAILS

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