

Sparkling Diamond

A new owner makes friends with his diesel-powered all-rounder, and so does the dog!

Story & photos by **Nick Lambert**



1 | You have to be fairly bold to buy any new aircraft, let alone one as unusual as the Diamond.

2 | Streamlining, modern materials, and high aspect ratio wings make carriage of four possible on just 135 hp. (Photo: Diamond Aircraft)

I WAS ALREADY awake when the alarm went off. The day had arrived when I was going to pick up my brand new Diamond Star. I had two reasons to be nervous. I was about to part with a vast amount of money, mine and the bank's. And I was buying a relatively unknown airframe with a completely unknown engine, the revolutionary Thielert Centurion diesel. Anyone who knows anything about aircraft will tell you that ignorance is not a good plan.

The vast sum of money had already gone from bad to worse: an IFR DA40D with long-range tanks and baggage extension will set you back almost 250,000. The strengthening euro meant this was now £20,000 more than when I placed the order.

My theory was, rather than buy an older aircraft and spend a fortune maintaining it, I would borrow a fortune and have predictable running costs while enjoying the latest technology. The fuel consumption should also make the aircraft a more than viable leaseback. All things being equal, the TDI should have a £25 per hour advantage over its avgas cousins in fuel alone. Only time will tell if these theories have any merit—one thing is for sure

though, I'm going to have a lot of fun finding out!

Bob Green, managing director of Diamond UK, had answered all my questions, taken me for several flights, and arranged a visit to the factory in Austria. The factory was impressive and went a long way to reassuring me I wasn't completely mad. It demands quite a leap of faith to believe that a 135 hp engine is capable of lifting four adults and fuel, and powering them along at 130 knots IAS. Having had all of this successfully demonstrated, it seemed I had run out of excuses.

Now I was on my way, by train, to Diamond's UK base at Gamston. I was accompanied by an old friend, Stuart, who flies commercially. He'd be on hand to make sure things didn't get too exciting on the return.

At the airfield we were introduced to Roy, the chief engineer, who was to run through the paperwork. All I wanted to do was have a look at the aircraft. G-CCFP was beautiful and I spent a few minutes staring, just

taking it all in.

We started to go through the paperwork of which there was a ton. Engine logs, airframe logs, propeller logs, certificates of this, that and the other. Stuart and I both spotted the aircraft was heavier than we expected and as a consequence would have a reduced payload. G-CCFP with her IFR spec weighed in at 806.5 kg. The King autopilot and HSI system alone weighed 28 kg. I explained this was not a deal breaker but I would need to be assured that I was not getting a 'heavy one'. Bob invited us to check out the empty weights of similarly equipped aircraft, which we duly did. All seemed to be coming in at roughly the same, so we proceeded with the acceptance flight.

As you approach this aircraft, it's clear that it represents something of a departure from the majority of the GA fleet. With its clean lines and upturned winglets it has more in common with the latest crop of kitplanes. This impression continues →





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3 | Turbocharged 135 hp aero-diesel and three-blade, constant-speed propeller.

4 | Fuel burn at 70% power costs £4 an hour!

5 | Gullwing canopies make access for passengers exceptionally easy.

6 | T-tail; sculpted rudder.

7 | Every pushrod, nut and bolt is clean, lubed and newly painted, a fresh start.

8 | Ah!—that new smell.

9 | Author paid extra to equip his aircraft for distance touring, including a generous, bang-up-to-date panel.

as you open the canopy and settle into the cockpit. The first thing you notice is not the well finished, if somewhat utilitarian, interior, but the fantastic all-round visibility. The only aircraft I've flown with better visibility is a weightshift microlight! The walkround threw up a couple of other issues: the T-tail is very high which makes it difficult to inspect, and the front canopy would be impossible to open if the aircraft were on its back. The rear door can be jettisoned but obviously this would necessitate crawling into the back first.

Engine management, although unlike anything I have flown before, is simple. Starting is similar to a diesel car: switch on the engine master, wait for the glow to extinguish, and then fire her up—no priming, no juggling mixture and throttle, just turn the key. Most of the engine checks are performed by pressing and holding the single *ECU Test* button. This tests both the main and back-up ECUs and cycles the propeller. The aircraft is covered in

sensors, which will warn you about everything from an open door to low fuel temperature. With no annunciator panel lights illuminated and all engine parameters in the green, it was time to go.

We were lined up on the runway with 150 litres of fuel and three well-fed pilots, basically at mauw. The book quotes a ground-roll of 360 metres and I don't think we were far off this. Retracting the flap, however momentarily, halted the climb until we sped up, then a climb of about 700 fpm resumed.

Once airborne, Bob took me us through the GPS-coupled autopilot, showing off its capabilities and warning of potential pitfalls. Having spent most of my time in microlights and club aircraft, I rarely get the chance to play with this type of kit. It was obvious that once I got the hang of it, trips into murk would be more relaxed and safer. With such a lot of information to take in, I wasn't enjoying the trip, but I was learning lots. When my brain had had enough, we returned. The aircraft is a piece

of cake to fly in the circuit and after a couple of touch-and-goes, both Bob and I were happy.

We needed to get back before dusk, so said our goodbyes and were on our way. Using the basic functions of the Garmin is pretty intuitive and we soon had the autopilot following our flight plan back to White Waltham, my home base. With the Diamond's superb all-round visibility, and with both us knackered, we were content to sit back and just enjoy the view. The airfield duly appeared in under an hour and after an uneventful landing we enjoyed a much needed pint in the bar.

I was back the following morning, keen to do some proper flying, having spent yesterday in a bit of a daze. As I approached she looked the most beautiful aircraft on the line... this may be a similar phenomenon to mothers and their babies. taxying out I realised that I was already beginning to feel comfortable in the aircraft, which was remarkable for the little time



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we'd spent together.

This time, with just me aboard, she leapt off the runway. There was still the pitch change as I retracted the flap but she then settled into a 1,000 fpm climb. Handling in the circuit is simplicity itself, not having to worry about undercarriage, mixture or propeller. Safe comfortable landings were no problem, but more practice would be required before they would become accurate. A few too many knots on final results in runway flashing past as you sit in the flare.

The POH suggests an approach speed of 67 knots at the maximum landing mass of 1,092 kg, a lower figure you will note than the mauw of 1,150 kg. In fact, under 'Abnormal Operating Procedures' the POH suggests 71 knots, should a landing be required at mauw. When travelling light, at an impossible 850 kg, approach speed should be 58.

I have not been used to such variation, tending in the past to just have one speed in mind for the approach. I thought this may be

indicative of a light wing-loading but research revealed that at 17.4 lb/sq ft, the wing-loading is higher than the 14.1 lb/sq ft of a Cessna 172, and approaching that of a Cessna 182 at 17.8 lb/sq ft.

Take-offs were not always straightforward. If I encountered one of White Waltham's many bumps, we'd be flung into the air prematurely then settle back down, considerably lengthening the take-off run. Realistically, I would want a 600-metre grass strip for daily use without heroics.

Time to enjoy

That evening, satisfied I could fly her, I returned with my girlfriend, Ali, who was already beginning to worry about the time I was spending with my new mistress. The flight was fantastic. For the first time I was flying without any agenda and that gave me the opportunity to really enjoy it. The technology was impressive, but this was really what it was all about. Stick in one hand, throttle in the other, following the

Thames at low level, basically just enjoying being airborne.

I reckon the Diamond's handling is superb, infinitely more fun than the Cessna's, only the Super Cub could tempt me, and that would have to be in the right conditions. I was beginning to confirm what I had hoped for, namely that the Diamond is a fantastic all-rounder. The Cirrus, now excellent value thanks to the weakening dollar, (I am an expert now) may be a better going-places machine if you ignore the fuel burn but I don't think it would feel so good just messing about.

Having now spent 25 hours in the cockpit, I'm still having a great time. In a nutshell, it's because I love being aloft and can now afford to spend almost as much time as I want airborne. The visibility is simply superb, sitting slightly ahead of the low wing gives great downward visibility while the vast canopy gives a great all-round view.

Kathy and Nigel, two BA pilots who fly out of White Waltham, kindly helped me with the flying for →

10 | The aircraft is covered in sensors to warn you of everything from an open door to low fuel temperature.



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11 | Take-off at mauw used 360 metres. Initial climb was 700 fpm. All-round visibility, 'Fantastic'.

the air-to-air photographs. I was in the back of the Nigel's Yak with my camera while Kathy and Jim, her extra set of eyes, flew the Diamond. Although an experienced pilot, Kathy had all of about forty minutes in the Diamond, but this did not stop her and Nigel flying a rock solid close formation.

As far as handling is concerned, the DA40D suits my requirements almost perfectly. I love the stick, although in an ideal world I would have a throttle in my left hand, like a Slingsby. While not having lightning quick reactions, she's responsive, while still being stable, exactly the qualities I enjoy. I wanted to be the type of pilot who would enjoy exacting aerobatics but soon discovered that I prefer playing around in Cubs; if you are similar, you'll love the Diamond.

For those that have flown the DA40 180, I found airborne handling was pretty much identical; obviously just having to set the load on a single

power lever is much less hassle than messing around with prop, power and mixture levers. This may cause problems in the future when flying something more complex like a Turbo Arrow.

Diamond may quote 154 knots at 10,000 feet, but in the real world, two up, at eighty per cent power she will cruise at 125 knots IAS at 2,000 feet, increasing to 100 per cent power (permitted for continuous use) will just achieve 130 kias. Throttling back to seventy per cent will achieve 90 kias at a fuel burn of ten litres or £4 per hour.

The brochures quote a ground-run of 1,171 feet and a distance to clear a fifty-foot obstacle of 1,410 feet for the 'D' with a ground-run of 1,017 feet and a distance to clear a fifty-foot obstacle of 1,516 ft for the 180. I'm not sure the avgas test pilot was trying very hard; having flown both types I found the 180 much more eager to get off the deck and in the initial climb.

A slight disappointment is the weight issue; it may not sound a great deal but the payload was never that generous to begin with and 16 kilos equates to about an hour's endurance. While I am on the subject of fuel, having had the long-range fuel tanks fitted gives 20.5 usg a side, but the gauge only goes up to 15—and why U.S. gallons anyway? Surely litres could have been organised? a small niggle maybe, but you wouldn't expect it on a new car.

On a more serious note, I have been contacted by an operator who has had some engine issues; he has started a forum on the Internet for owners to share their experiences, which will be invaluable. The engine manufacturer, Centurion (a division of Thielert), does have an 'event log' on its website which is admirable so long as the company keeps it updated. It seems committed to making sure that the engine is reliable; some engine components are being replaced, at the



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manufacturer's cost, well ahead of schedule. At the fifty-hour check samples of oil and filters were removed for analysis. How you feel about this depends whether you are concerned about why they are doing all this, or just happy they are. At the moment I fall into the latter camp.

Now may be a good time to talk about the TBR. There is no TBO—Centurion simply replaces the engine, so TBR. This is presently set at 1,000 hours with the aim of extending this before any engines reach this. Not entirely straightforward, so I included a quote from the company: 'The engine has a warranty of 2 years or 1,000 hours, whichever occurs first. And the engine has a 2,400 hours/12 years pro rata service package whichever occurs first. During this time frame the customer pays only a quota for the engine use he got. In the unlikely case that an engine breaks at 1,000 hours e.g. the customer has to pay only for

1,000/2,400 to get a new factory exchange engine. There are no overhauled engines available.'

The cost for a replacement engine is £18,000 including labour, somewhat more than a Lycoming factory overhaul but you get a brand new unit. If, as I hope, the Centurion engine proves reliable in the field, I can see only benefits from running this type of engine. Sure, it would be nice to have a few extra horses, especially as fuel burn is not really an issue, but then that's always the case. The engine does the job well enough and landing distance would always prevent it from being a real STOL performer.

It's worth having a thorough understanding of the electrical system; because of the power requirement of the ECUs; a flat battery will result in full stealth mode, not just a loss of avionics. To combat this, a back-up battery is installed as a further source of power. In addition, IFR models, such

as mine, have a further non-rechargeable battery. When the emergency switch is flicked it will power the artificial horizon and light for at least one hour.

The fuel system seems to be unnecessarily complex. Normally fuel is only taken from the left wing; fuel in the right tank needs to be transferred manually with an electrical pump. If you want to keep the tanks balanced this involves turning the pump on for a couple of minutes every thirty minutes. Not a major chore but you would have thought this could have been achieved automatically. In the event of pump failure, switching the fuel valve to 'emergency' results in an engine-driven fuel pump transferring fuel to the main tank.

The FAA has just completed a study looking at the safety of what it calls 'technically advanced airplanes'. Nothing to do with a retractable or other 'complex' features, this definition is based on the autopilot →

12 | Realistic cruise is 125 knots. Payload was slightly disappointing... and at least one operator has 'engine issues'.

13 | Checked out and ready to go.

14 | 'The aircraft is a piece of cake to fly in the circuit'; fuel, navigation systems and autopilot take longer to master.



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15 | 'A fantastic aircraft, a jack of all trades.'

16 | Smoky (on the right) threw up before even entering the Beagle Pup; falls asleep in the Diamond (but only below 70% power).



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and avionics installed. As such, this is not limited to new aircraft but also includes those that have been upgraded. The study has been prompted by an unexpected spike in accidents. As well as the unusual electric and fuel systems, the Diamond is fitted with a GPS moving map and integrated autopilot. The study makes it clear that, if properly understood, these have the capability to increase safety; if not familiar with these systems they can get a pilot into trouble. Indeed, although I have not had any bad experiences, I have used these systems in conditions that maybe I shouldn't have until I have a better working knowledge. It has to be said though that the avionics can fly a much better ILS than me, so I have decided that some further instruction would be sensible. Jersey Aero Club runs several aircraft equipped with the Garmin 430s as well as having all manner of different

approaches in the vicinity. I am planning a trip over to master the finer points of the avionics.

In conclusion, I think the Diamond DA40D is a fantastic aircraft, a real jack of all trades. Even Smokey, my lurcher, seems to enjoy the aircraft; she used to throw up before even getting in the Beagle Pup I used to fly, but manages to sleep in the Diamond at anything less than seventy per cent power.

The finish on the aircraft is excellent, the fuel filler is almost a work of art. There are a few items that are less impressive: the door locks wouldn't be out of place securing a rabbit hutch and the wingwalks are the most easily stained surface on the planet. It is clearly an enormous outlay but the aircraft gives you an awful lot. All this and miserly running costs—topping up after 5.1 hours airborne I was presented with a bill for a mere £28. ■

Specification

Diamond DA40D

Dimensions

Wingspan	11.94 m
Wing area	13.5 sq m
Length	8.01 m
Height	2 m
Cabin height, seat to roof	40 in
Cabin width	42 in
Seating	4

Weight & loadings

Empty	806.5 kg
Useful load	343.3 kg
Mtow	1,150 kg
Max baggage	limited only by C of G
Fuel	155 litres
Max wing loading 1	7.4 lb/sq ft
Max power loading	8.52 kg/hp
g limits	+4.4/-2.2g

Performance

V _{ne}	178 kt
Max level speed @ 10,000 ft	154 kt
Cruise 70%/10,000 ft	132 kt
Stall	49 kt
Take-off run	1,171 ft
Landing run	1,017 ft
Max climb, s/l, mtow	780 fpm
Service ceiling	at least 12,000 ft
Range, no reserve	1,100 nm

Engine & propeller

Turbocharged, Thielert Centurion 1.7 litre aero-diesel, producing 135 hp. No TBO as such; engine replaced at 2,400 hours. Propeller: MT three-blade constant speed.

Manufacturer & distributor

Diamond Aircraft Industries GmbH, N. A. Otto-Straße 5, A-2700 Wiener Neustadt, Austria. Tel: 00 43 2622 26700, fax: 00 43 2622 26780, web: www.diamond-air.at
UK distributor: Diamond Aircraft UK Ltd, Gamston Airport, Retford, Notts, DN22 0QL. Tel: 01777 839 200, fax: 01777 839 300, e-mail: diamond@diamondair.co.uk

Price

€ 250,000 (tbc)

➤ **Pros:** engine management, handling, visibility, running costs, aircraft finish

➤ **Cons:** complex fuel management, payload

Websites

www.centurion-engines.com
www.diamond-air.at
www.diamondair.co.uk
www.dapo.org