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Total Eclipse

Will the reincarnated six-seat VLJ achieve the success promised a decade ago? *Pilot* spends a short December day flying Aeris Aviation's newly-arrived European demonstrator

Words Peter Turner Photography Peter R March

The design of the Eclipse 500 Very Light Jet (VLJ) grew out of Burt Rutan's Williams V-Jet in the 1990s. To improve the aircraft and put it into production, Eclipse Aviation Corporation was founded in 1998 by former Microsoft executive Vern Raburn, with Bill Gates as a major shareholder. Having been offered an attractive incentive package in 2000, the company moved to its new facility in Albuquerque, New Mexico.

The original design aim was to produce a low-cost light jet that could be flown by pilots with experience on high-performance GA aircraft. It was to be a straightforward and economic machine to manufacture and maintain, with an initial price of less than one million dollars. While this was a tall order, most of the aviation industry not only accepted the concept, but were mesmerised by it.

I have to admit that I was one of the doubters. The numbers just did not stack up: Eclipse's target was to achieve an order book of 2,000 aircraft a year, which represented a huge slice of a market already served by well-established light jets, albeit not VLJs. It simply wasn't going to happen.

Despite this, non-refundable deposits started to roll in with early positions selling for as little as \$800,000 – a quarter of the price of the nearest light jet rival.

Construction of the prototype started in 2001 and it first flew on 26 August 2002. It quickly became apparent that the Williams International EJ22 engines were not powerful enough. Consequently the performance guarantees were unachievable. So the EJ22s were replaced by Pratt & Whitney PW610F-A turboprops.

The engine switch required a redesigned airframe, which resulted in a production delay of two years. The opportunity to make other changes was taken and the re-engined, improved prototype flew again in 2004, by which time the price had risen to \$1.4m. Despite this the orders continued to flow in, and stood at 2,500 at the peak of demand. Many of these were from start-up air taxi companies such as DayJet, which ordered an ambitious 1,400. The basic fact that the aircraft was costing far more to produce than the selling price seemed to go un-noticed and the hype ran on.

In February 2006 the company won the coveted National Aeronautic Association's Collier Trophy for its work with the Eclipse 500. As only the prototype was flying at the time this proved to be a controversial award.

FAA certification, with some caveats, was granted on 27 July 2006, followed by 



The 500 handles very nicely, although the control forces are a little higher than you might expect, especially in roll

the first delivery of a customer aircraft in January 2007. EASA certification for Private category operation was awarded during November 2008.

While all this was going on, Eclipse's Wisconsin facility had been designing and building a second, four-seat single engine aircraft initially called the Eclipse Concept Jet. It had been built in complete secrecy at NASA's Wallops Flight Facility in Virginia and first flew on 2 July 2007. It was unveiled, much to everyone's amazement, at EAA Air Venture, Oshkosh just three weeks later. Despite the company declaring it was not going to put the single into production, it began to take orders and deposits after naming it the Eclipse 400.

By the end of 2007 Eclipse had built 104 Eclipse 500 aircraft, but had to lay off ten per cent of its workforce and law suits for non-payment to sub-contractors had started. In mid-2008, as a condition of a desperately needed re-financing package, Vern Rabum resigned as CEO and the finance company's president, Roel Pieper replaced him.

However the respite was short lived and the pack of cards fell very quickly. The 400 project was suspended, the supplier of the 500's tailplane closed its plant and the law suits continued. By the end of August

38 per cent of the workforce was laid off and Pratt & Whitney repossessed 24 of its engines. In September DayJet, Eclipse's largest customer, ceased operations and in October production was halted. Then on 25 November, just four days after announcing EASA certification, the company finally collapsed into bankruptcy.

After lengthy proceedings, Eclipse Aerospace Inc – headed by businessman Mason Holland and a seasoned team of aviation executives – completed its bid for the assets of the old Eclipse company. Moving into the Albuquerque facility the new company recommenced operations on 4 September 2009.

The plan was to upgrade, refurbish and re-engine the aircraft

Under Holland's control, Eclipse Aerospace immediately set about improving the Eclipse 500. Its plan was to upgrade, refurbish and re-engine the finished aircraft it had acquired, renaming them Total Eclipse. Under a separate transaction

the new company purchased 26 aircraft, repossessed by the original lender from the DayJet fleet. Next on the agenda was to put the new, higher-specification Eclipse 550 Jet into production, completing the unfinished airframes to 550 spec and fully reopening the production line for deliveries beginning in mid-2013.

Improvements to the Total Eclipse included securing approval to operate flight in known icing conditions and improving the avionics suite to make it 'the most advanced in the light jet industry'. Owners of aircraft already delivered were offered these advanced upgrades, but with the new company having no obligation to carry out the improvements, they would have to be at the owner's expense.

Scheduled improvements to production 550 aircraft are to include new, redesigned Standby Display Units, dual and redundant Flight Management System (FMS), Synthetic Vision, Enhanced Vision, auto-throttles (which will be a first in the light jet industry) and anti-skid brakes.

The company was given a big boost in 2010, when the Sikorsky Aircraft Corporation bought in as a shareholder, giving much needed experience in quantity production and credibility in the industry.

Based at Dunkeswell

Pilot's invitation to fly the aircraft came from David Hayman, CEO of the new UK and European Eclipse distributor Aeris Aviation, based in Devon. David worked for some big names in financial services for 26 years and gave that up to found and head up Aeris. He holds a CPL, has some 1,500 hours flying experience and – as well filling the CEO's role – will be one of two demonstration pilots. Aeris's wholly owned Total Eclipse aircraft is currently based at Dunkeswell, with nearby Exeter Airport providing a suitable and handy weather diversion, with all the facilities.

With the usual problems of getting two aircraft, three pilots, a photographer and the British weather together, it came as a welcome surprise that we achieved our goal very shortly after N843TE arrived in the UK.

On a very cold, but crystal clear December morning Peter March and I met up with David and Phil, his demo pilot, at Dunkeswell. The weather was perfect, except for a little early morning ice and frost, but with a very short day available to us we were to have our work cut out.

Tango Echo was waiting for us on the hangar apron and looked good, with its lovely lines enhanced by the simple but

attractive paint scheme. After a briefing for the air-to-air photography, Phil took me through the walkaround. Most exec jets are very straightforward in this respect but the Eclipse beats the lot. With just a panel to open on each engine to check the oil levels the rest is common sense. It is that simple. Refuelling is over-wing through caps on top of the tip tanks and the only niggle I have is that, because of the lack of fuel heaters, anti-ice additive has to be used – a process which involves squirting the toxic fluid into the fuel flow as the tanks are filled. This is not popular with refuellers or pilots.

Looking inside, I was immediately struck by how cosy it is. Although 'TE has six seats, one has been removed to make life easier getting in and out, and give more legroom in flight. The interior décor is very tasteful and finished to a high standard, giving a light and airy feel to the cabin. The baggage area is behind the rear two seats and has no external door, so all items have to be loaded through the cabin. Not ideal, but unavoidable given the aircraft's size. Oh yes – and there's no toilet-seat.

As I was not rated on the Eclipse and Phil was relatively new to the type, he took the left seat and myself the right. With the lack of a conventional yoke, slipping in was no problem for me, bearing in mind I'm only 5ft 6in short. Tall pilots have a bit of wriggling to do, but once seated there is plenty of leg- and head-room. But this is, after all, the smallest exec jet in the world. Once in, with my seat adjusted vertically (yes, I know, fully up!) and horizontally (fully forward) I felt comfortable, the pedals and the side-stick falling naturally to hand.

Phil closed the split-entry door, clambered into his seat and gave me a comprehensive cockpit briefing.

The layout of the panel and sub-panels, dominated by the three screens, is very functional. The overhead panel is for engine start and shut-down while the eyebrow panel houses the master warning and engine fire warning lights and the flight director (FD) mode selectors.

The main panel is dominated by the three large display screens fed by the Avio NG Integrated Flight Management System (IFMS). The two Primary Flight Displays (PFDs) give all the usual flight parameters plus target speeds, altitude alert, weather radar, autopilot settings, collision avoidance, com, nav and transponder frequencies, plus a whole host of other information. The central Multi-Function Display (MFD) is topped by a standby PFD, engine and configuration page and

Central Alert System (CAS) messaging window. The lower half is split in two, the left side showing either a multitude of synoptic system pages or the flight plan details and the right either the map display or Jeppesen E-charts. Both of these show the position of the aircraft either in flight or, when an airport taxi chart is displayed, on the ground. Under each PFD there is a pull-out keyboard, which can be used to make a variety of inputs on the screens. As the same selections can be made on the various knobs and buttons on each unit, I chose not to use this facility.

To the left and below the three screens are panels for the electrical, pressurisation, lights and ice protection systems plus the landing gear selector. Circuit breakers and com switches are located on the left side of the panel and in the armrests on each cockpit wall. The centre console from front to back houses the park brake, power and flap levers and the rudder trim knob.

Elevator and aileron trim are activated by a coolie hat on the top of each side stick. There are also two buttons on the top which control autopilot disconnect and silencer. On the front face are transmit and squawk buttons, plus a red panic (all interrupt) button which simultaneously disconnects the autopilot, yaw damper and flight director and – if held down – interrupts the stick pusher and trims.

Essentially all electric

The Eclipse is essentially an all-electric aircraft right down to the gear and flap systems. It is no surprise then that looking after the electrics is all-important and this begins with engine start.

If the battery system is below 23 volts or the oil temperature below 5°C, the Eclipse needs external power for engine start in order to protect the batteries. This can either be provided by a ground power unit or portable power pack (weighing about 25 lb), which can be carried in the aircraft. Furthermore if the oil temperature is below -20°C engine start is prohibited to prevent damage. It was 3°C at Dunkeswell so we plugged in a power pack. With the 'Before Starting' checks complete, I fired up the right engine first by selecting the appropriate start switch on the overhead panel. From there on it was fully automatic and all I had to do was monitor the electric and fuel synoptic pages.

The usual after-start tests and checks were quickly completed, including setting weight and balance, v-speeds and outside air temperature data into the system.

Taxying is straightforward and generally no problem. The nosewheel is castoring, ☑

Clear skies and sunshine accentuate the Total Eclipse's undoubted showroom appeal



SPECIFICATION

EA TOTAL ECLIPSE 500

■ DIMENSIONS

Wingspan	11.6m
Length	10.2m
Height	3.36m
Cabin height	1.28m

■ WEIGHTS AND LOADINGS

Empty weight (typical)	1,691kg
Max takeoff weight	2,724kg
Max landing weight	2,542kg
Useful load (single pilot)	950kg
Fuel capacity	770kg
Max baggage	118kg

■ PERFORMANCE

V _{mo}	285kt (0.64 Mach)
Climb	2,456fpm
Take off distance (over 50ft)	730m
Landing distance (over 50ft)	714m
Range (NBAA reserves)	1,125nm

■ ENGINE

2 x Pratt & Whitney Canada P610F turboprop, each rated at 900lb takeoff thrust

■ MANUFACTURER & AGENT

Manufacturer: Eclipse Aerospace
 email: sales@eclipse.aero
 web: www.eclipse.aero
 UK and European Distributor:
 Aeris Aviation, tel: 01297 578477
 (contact David Hayman (CEO) or
 Neil Harvey (marketing))
 email: sales@aerisaviation.co.uk
 web: aerisaviation.co.uk



aircraft to the activation of the stick pusher and a typical high-level sector would have all added to the evaluation but time didn't allow for that.

Phil assures me that TE performs as specified, as the original 500 should have done all those years ago – and I have no reason to doubt his word. His experience so far, including the delivery flight across the pond, put fuel burns and true air speeds right on the numbers.

Eclipse Aerospace quotes an IFR range with reserves and four occupants of 1,125nm, which outdoes the larger Mustang and Phenom 100.

At last the aircraft has delivered its promise. At \$2.15m for a low-time example, the Total Eclipse is priced way below the competition – especially bearing in mind it comes with factory warranty, a new IFMS and other goodies. The new Eclipse 550 Jet is a further step forward for the design and is still very competitively priced at \$2.695m.

In conclusion I enjoyed flying this lovely little aircraft (incidentally the 150th type in my log book). Despite a few giggles it is fun to fly and if you are in the market for a VLJ, certainly well worth serious consideration. ■

Above: with no reverse thrust and (at least for the time being) no anti-skid brakes, care must be taken on landing

Below: welcome aboard – one of Tango Echo's seats has been removed to make entry and egress a little easier





Eclipse feeling solid and responsive. I just wish I could have admired the scenery!

With the shots in the bag, I pulled away and let the Cirrus return to Dunkeswell ahead of us so that Peter March could disembark to take some approach to land photos. That done, Phil carried out a textbook short landing and we taxied in for a quick lunch and de-brief in the airport restaurant. And very nice it was too.

Workload is high, but made easier by information presented by the IFMS

Suitably fed and watered it was time for me to fly the Eclipse to Blackbushe. The plan was to drop David off to catch a flight to the States to attend his conversion course.

After engine start we completed the checks and programmed the FMS, entering the outside air temperature and completing the weight and balance page. Our takeoff weight was to be 200lb below gross at

5,800lb giving a V_r of 89 knots and V_{50} of 102 knots. The FMS gave us a take-off N_1 of 91.4% and the appropriate numbers came up on the PFDS.

Back-tracking Runway 04 for departure we completed the nine items on the 'Taxi' and 'Before Take-off' check lists before setting the FD to TOGA (Take-off And Go-Around), HDG (Heading) and ALT SEL (Altitude Select) modes to activate the command bars prior to lining up. With the green *Take-off Configuration OK* caption up we were ready to go.

Holding the aircraft on the brakes, I increased the power to about 85% N_1 , checked the temperatures and pressures, released the brakes and advanced the power levers to the forward detent allowing the FADEC (Full-Authority Digital Engine Control) to set and maintain takeoff power. With a slight crosswind from the left, keeping straight was easy and acceleration brisk. Rotation required a bit more effort than I expected and was about on the nail 2,100 feet down the 3,175 foot runway.

With a positive rate of climb I retracted the gear, on passing V_{50} brought the power back to max continuous, accelerated to $V_{50} + 20$ and at 400 feet retracted the flaps

Above Left: performance at last matches the claimed figures, the Total Eclipse having especially long legs

Above: it's all glass – the only mechanical dial we found in the cockpit is on Peter's wristwatch

Facing Page, inset: an aircraft icon is shown on the electronic Jeppis plate, aiding situational awareness

and completed the 'After Take-off' check list. Engaging the autopilot and changing from HDG to NAV mode on the FD, I was then able to sit back and try to soak up the information being presented to me by the IFMS. Bearing in mind this was my first experience of the system and Phil had little time on the aircraft, I did find it quite a mental challenge. Like all similar modern systems I find they are very good and intuitive in some areas but overly complicated and user-unfriendly in others. What is quite apparent is that a thorough IFMS simulator session, as given by EA on the type conversion course, is absolutely essential. Self-teaching is simply asking for trouble – something you really don't need on a single-pilot jet.

Levelling off at 5,000 feet with the 'Climb' and 'Cruise' checks complete, I set up 85% power to give us the maximum cruise speed of 250 knots for this altitude.

Phil opted to remain on QNH rather than 1013 as we would soon be descending under the London TMA.

Fuel burn at this setting was in the order of 700lb/hr, much as one would expect at this lower level, and still quite frugal given our speed. Peter reported a very quiet cabin and could easily listen in to our chat up front. Crews be warned!

On this short, 25 minute sector we were kept quite busy. What with me picking Phil's brains and radar handovers from Yeovilton to Boscombe Down and then Farnborough, the workload was high, but at the same time made easier by the information presented to us by the IFMS.

Rather than make a straight-in approach to Blackbushe's Runway 07, I elected to join overhead to give myself time and a feel for the aircraft in the circuit before making the approach. Most of the 'Approach' and 'Before Landing' checks were completed on the downwind leg including setting up a V_{ref} (final approach speed) of 88 knots on the FMS. As per customary practice, I delayed selecting landing flap and disconnecting the yaw damper until established on finals. With the gear down and takeoff flap selected a circuit speed of 140 knots was flown, which was quite comfortable.

Giving myself a leisurely four-mile final approach, I selected landing flap at 1,000 feet QFE, disengaged the yaw damper and slowed the aircraft to $V_{ref} + 10$. At our weight of just under 5,000lb, a power setting of around 72% held the speed and kept us nicely in the groove.

At fifty feet I retarded the power levers and the speed bleeds off nicely to give us V_{ref} over the hedge. With a gentle flare and thanks to the trailing link undercarriage I greased it on – very satisfying.

Without thrust reversers, lift dump, speed brakes or thrust attenuators it was all down to the wheel brakes and those skinny tyres to slow us to taxi speed. Used to having at least two of these devices available to me, I did find the deceleration a bit slower than I would have expected, but that said we could have stopped in the predicted distance of 2,300 feet had we so wished. Anti-skid is not fitted on 'TE but will be soon available as a retrofit and will be standard on the 550.

We stopped briefly by a Cessna Mustang VLJ, David jumped out, waved a cheery goodbye and we taxied out for departure. Taking off on 07, I turned hard right on track



to the west and initially level at 2,000 feet to stay below the TMA. The plan was to fly a coupled ILS at Exeter followed by a missed approach and diversion to Dunkeswell. The flight back was smooth and uneventful and soon we were talking to Exeter Approach. With the approach set up on the MFD and the plate for Runway 26 depicted, we were vectored on to the localiser with the aircraft's position showing as a green icon on the screen – a really nice feature, giving full spatial awareness at a glance. The aircraft behaved impeccably on the approach and at DA (Decision Altitude) I pressed the TOGA button while advancing the power levers, raised the gear and with a positive rate of climb established, re-engaged the auto-pilot and let the aircraft fly the missed approach. All very easy and just what is needed for single-pilot ops. A short hop and we were back into Dunkeswell. Job done.

There is a lot more I would like to have tried: single-engine work, slowing the

which provides a relatively small turning radius. However care needs to be taken not to turn too sharply as this can cause the nosewheel to go too far off-centre and result in embarrassment.

The pre-takeoff check list is short, just seven items – one of which is to ensure the batteries are receiving less than seven amps of charge. Once all is complete a *Take-off Configuration OK* green caption illuminates and you're ready to go. An excellent safety feature.

Phil demonstrated the first takeoff. On a short runway with a few remaining damp patches I was more than happy with that. There is no V_1 (decision speed) on the Eclipse, just V_r (rotate) and V_{50} (fifty-foot target speed). Phil briefed that he would abort the takeoff for any malfunction before sixty knots, and between that and V_r only for a major

malfunction, which seemed sensible to me. The Cirrus camera ship, owned and flown by David, departed ahead of us to an agreed rendezvous at 2,000 feet to the west of Sidmouth. As soon as we were in the cruise Phil handed over to me to get a feel of the Eclipse's handling before forming on the Cirrus for the photography session.

The handling is good and precise in all axes, the only minor surprise for me was the side-stick loads, which are heavier than I expected – especially in roll. Given the mechanical linkages and small lever arm of the side-stick this is not surprising and I soon became used to it.

Closing on the Cirrus from its rear starboard quarter I suddenly realised I hadn't flown jet formation for quite a while and had a bit of work to do if the job was to be a success. Getting within a few yards to get the required shots is

always demanding, more so when your total time on type is only fifteen minutes. One problem with holding formation in a jet is the spool-up time of the engines, which require constant small power adjustments. However this proved much easier than expected due to the quick response of the Pratt & Whitney engines. Despite this, due to the inherent clean airframe of the Eclipse combined with the lack of speed brakes, I did start to overshoot on the first attempt and knocked it off for a another go.

The second attempt was on the ball and we tucked in nicely. Formation flying is a good yardstick for an aircraft's handling characteristics and the Eclipse was right on the mark. We were filming downwind of the beautiful South Devon Jurassic Coast and so experienced a little turbulence but it was no problem keeping on station, the



Flight-tester Peter keeps station with the Cirrus camera ship along the colourful South Devon Jurassic Coast



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PILOT REPORT: ECLIPSE 500 VON ECLIPSE AEROSPACE

Wiederauferstehung

Mit der Eclipse 500 begann der Hype um die Very Light Jets. Jetzt wird der kleinste Businessjet auch in Europa wieder angeboten; die Produktion des Nachfolgers läuft im Sommer an. Wir haben den Zweistrahler ausprobiert

Jet-Set: Die Deice-Boots und das teilweise verkleidete Fahrwerk sind bei der eleganten Eclipse 500 gut zu erkennen

FOTO: PETER R. MARCH

Profilsicht: Klein und handlich wirkt die Eclipse 500 – tatsächlich nicht so viel mächtiger als eine große Kolbeneinmot



Kunstwerk: futuristisch anmutende LED-Leuchten am Heckkonus



Flugfläche 380: 347 Knoten Spitzengeschwindigkeit erreicht die Maschine in dieser Höhe



Sidestick: Die Eclipse 500 steuert sich von Hand etwas schwerfällig. Dafür steht jede Menge Leistung zur Verfügung

FADEC: Triebwerke auf ON/START – den Rest erledigt die Automatik. Bei schwerem Wetter wird die Zündung aktiviert

Sauerstoff: Die Masken neben den Kopfstützen von Pilot und Co sind bei Flügen bis in FL 410 im Notfall lebensnotwendig

in Grün. Die Freigabe haben wir, also geht es los – und wie: bei 90 rotieren wir, mit 120 Knoten und 3000 Fuß pro Minute verschwinden wir in den grauen Winterhimmel. Kurz darauf sind wir on top im Sonnenschein. Bremen Radar fragt ungläubig, ob unser kleiner Jet auf 38 000 Fuß steigen kann – wir bestätigen, den Rest macht der Autopilot.

Flugfläche 410 wäre die maximale Höhe der Eclipse, dort erreicht sie ihre beste Leistung. Doch wir bleiben voll beladen etwas tiefer. Die Druckanlage hält das Kabineninnere bei angenehmen 7000 Fuß. Es dauert eine Weile, bis die Maschine voll beschleunigt hat, doch dann sind wir mit Mach 0,6 dabei: 347 Knoten True Airspeed bei einem Verbrauch von etwa 220 Litern pro Stunde.

Angenehmes Reisen hier oben: Die kleinen Düsen machen so wenig Lärm, dass Neil und Christina jedes Wort verstehen, das wir vorne reden. Dank großer Fenster wirkt die Kabine licht und freundlich.

Es ist Zeit, sich an die wilde Geschichte der Eclipse zu erinnern, die sich bestens für eine Soap Opera eignen würde. 1998 beschloss der ehemalige Microsoft-Manager Vern Raburn, den Businessjet neu zu erfinden. Sechssitzig, klein und effizient sollte sein Very Light Jet (VLJ) werden – vor allem aber versprach Raburn, das Flugzeug für 800 000 US-Dollar anzubieten, da er über 1000 Stück pro Jahr verkaufen würde. Lufttaxi würden



Einmal Öl prüfen: Darauf beschränkt sich der Außencheck an den zwei Jet-Triebwerken

dank der Eclipse so selbstverständlich werden wie die auf der Straße.

Was Skeptiker von Anfang an für unmachbar hielten, fand regen Zuspruch unter Investoren – und verleitete auch viele andere Flugzeughersteller zur Entwicklung eines VLJ (siehe Kasten). 2006 wurde die Eclipse 500 zertifiziert – halb fertig, ohne Enteistung und mit nicht voll funktionsfähiger Avionik. 260 Stück wurden schließlich gebaut, bevor 2008 erst Raburn rausflog und dann die Firma mit großem Knall Pleite ging. Eine Milliarde Dollar Investorengelder, so schätzen Experten, gingen beim größten Crash in der Geschichte der Allgemeinen Luftfahrt verloren.

Dann kam 2009 eine Gruppe Geschäftsleute um den Amerikaner Mason Holland und kauften Werk und Zulassung für gerade mal 45 Millionen Dollar auf. Unter dem Namen Eclipse Aerospace lief die Ersatzteilerstellung wieder an. Holland kaufte etliche Flugzeuge zurück, ließ

DER GROSSE HYPE UM DIE VERY LIGHT JETS

CIRRUS VISION SF50 2015 soll der einstrahlige Personal Jet mit einer maximalen Flughöhe von FL280 zugelassen sein. Er hat vorne zwei und in der Mitte drei Sitze, hinten ist Platz für zwei Kinder. Die SF50 hat ein CAPS-Gesamtrrettungssystem. Derzeit wird die SF50 für 1,96 Millionen US-Dollar angeboten.

CESSNA CITATION MUSTANG Mit 3946 Kilo MTOM ist die sechssitzige Mustang der nächstgrößere Jet nach der Eclipse 500 – und sie ist bereits seit einigen Jahren am Markt. An Bord ist auch Platz für eine Toilette. Ausgerüstet mit einem Garmin-G1000-Glascockpit kostet die Maschine etwa 3,285 Millionen US-Dollar.



Bitte vorderes Flugzeug raustempeln!



PIPERJET ALTAIRE Der ursprüngliche PiperJet (Foto) wurde ab 2006 als einstrahliger Siebensitzer mit demselben Rumpfdurchmesser wie die propellergetriebene PA-46 konzipiert. 2010 wurde unter dem Namen Altaire eine Neuentwicklung mit größerer Kabine angekündigt. 2011 wurde das Projekt eingestellt.

DIAMOND D-JET Mit fünf Sitzen und einem Triebwerk flog der D-Jet 2006 zum ersten Mal. Er sollte eine Flughöhe bis FL250 erreichen und besonders preiswert sein. Im Frühjahr 2013 hat Diamond die Entwicklung eingestellt, nachdem die Suche nach Investoren erfolglos verlaufen war.



FOTOS: CIRRUS AIRCRAFT, CESSNA AIRCRAFT, CLAUDIO STOCK, MIKE FITEZ



Italien-Flug: David Hayman von Aeris Aviation und fliegermagazin-Chefredakteur Thomas

TEXT **Thomas Borchert**
FOTOS **Christina Scheunemann**

Mensch, ist die niedlich! Das ist mein erster Gedanke, als wir in Hamburg auf die Eclipse 500 zugehen. Dass die Maschine der kleinste Jet am Markt ist, wusste ich vorher – aber so klein?! Tatsächlich kommt die Eclipse der Wunschvorstellung recht nahe, einfach einen E-Klasse-Viersitzer mit einer Düse statt mit einem Kolbenmotor auszurüsten.

Ganz so klein ist die Eclipse dann doch nicht: Sie hat zwei Triebwerke, deren Einläufe sich allerdings mit den Fingern einer ausgestreckten Hand fast überdecken lässt. Über zwei Öffnungen an den Flügelspitzentanks lässt David Hayman, Chef des gerade gegründeten Europa-Vertriebs für die Eclipse, Jet Fuel nachfüllen. Aeris Aviation heißt Davids in Südengland ansässige Firma, seinen PR-Chef Neil Harvey hat er gleich mitgebracht. Wir wollen einen für Businessjets typischen Europa-Flug mitmachen: Morgens von Hamburg (EDDH) zum Flugplatz Biella (LILE) westlich von Mailand, wo David einige Demoflüge machen will – und abends wieder zurück. Nur eineinhalb Stunden Flugzeit hat David berechnet.

Über die Stufen im Unterteil der Klapptür geht es in die Kabine – und die bietet den beiden Passagieren in der hinteren Sitzreihe locker 1,5 Meter Beinfreiheit. David hat getrickst: Ab Werk wird die Eclipse mit fünf Sitzen ausgeliefert, von denen einer genau gegenüber der Tür positioniert ist. Den hat der Händler aber ausgebaut: »Wir sind nur zu viert und haben so einfach mehr Platz.« Auf Wunsch können Eclipse-Besitzer sogar einen sechsten Sitz einbauen. Doch wir er-



Avio NG: Das Glascockpit der Eclipse hat eine ausfahrbare Tastatur unter beiden PFDs



Geräumig: Wenn die mittlere Sitzreihe ausgebaut ist, haben die Passagiere viel Platz

reichen schon mit vier Personen und reichlich Jet Fuel die MTOM von 6000 US-Pfund.

Eine Gepäcktür hat die Maschine ebenso wenig wie eine Toilette. Taschen und Koffer müssen über die Klapplehnen der hinteren Sitze gewuchtet werden. Zwischen den Vordersitzen schlängelte ich mich an der Mittelkonsole vorbei auf den rechten Sitz.

David aktiviert die elektrischen Systeme, die drei Displays des Glascockpits erwachen zum Leben. Avio NG nennt sich das eigene für die Eclipse entwickelte Integrated Flight Management System (IFMS). Anfangs wirkt es im Vergleich zum gewohnten Garmin G1000 unvertraut, doch ich finde mich schnell auf den zwei Primary Flight Displays und dem breiten Multifunktionsdisplay zurecht. Nach einigem nervigen Knöpfedrehen entdecke ich die auf Tastendruck ausfahrbare Tastatur unter dem PFD. Jetzt

macht sogar die Eingabe des Flugplans mit seinen vielen Wegpunkten Spaß.

Doch erstmal Anlassen. Was bei manchen Turbinen aufmerksames Beobachten der Temperaturen und Drehzahlen erfordert, reduziert sich bei der FADEC-Steuerung der Pratt&Whitneys in der Eclipse auf einen Drehknopf: Den stelle ich auf ON/START, und schon erwacht das Triebwerk zum Leben, kontrolliert von der Elektronik.

Oben rechts auf dem MFD meldet die Avionik allerlei Warnungen, doch die verschwinden, als wir die Checkliste abarbeiten. Auf dem Display nehmen wir die Weight&Balance-Berechnung vor und lassen Rotations- und Steiggeschwindigkeit errechnen. Erst dann leuchtet auf dem MFD der Satz »Take-off Configuration OK«

»Ohne den Mittelsitz haben die Passagiere sehr viel mehr Platz«

David Hayman
Aeris Aviation



Zweigeteilt: In die untere Türhälfte sind Trittstufen integriert. Das geschleppte Hauptfahrwerk sorgt für weiche Landungen



Ganz oben: In FL380 überfliegt man Winterwetter problemlos

Landekonfiguration: Mit gut 100 Knoten fliegt die Eclipse 500 nur wenig schneller als eine große Kolbeneinmotan



FOTO: PETER R. MARCH

sie überholen, neu lackieren und mit dem Avio-NG-Glascockpit sowie FIKI-Enteisung ausstatten. Für 2,15 Millionen Dollar sind solche Total Eclipse genannten Maschinen heute im Angebot; unsere N843TE ist eine von ihnen. 2010 adelte der Hubschrauberhersteller Sikorsky das Eclipse-Projekt mit einer finanziellen Beteiligung. Im Sommer soll nun die Produktion der verbesserten Eclipse 550 anlaufen, deren Rumpf und Flügel im polnischen PZL-Werk gebaut werden, das Sikorsky gehört. 2,7 Millionen Dollar kostet die 550, dafür gibt es unter anderem ein Autothrottle und Anti-Skid-Bremsen.

Die meisten anderen Hersteller haben ihre Jet-Projekte unter großen Verlusten eingestellt, das Kürzel VLJ ist tabu. Zwei sind geblieben: Cessna kam schon 2006 mit der Citation Mustang auf den Markt, die deutlich größer als die Eclipse ist. Cirrus plant seinen einstrahligen Personal Jet für 2015.

Kurz hinter Zürich beginnen wir unseren Sinkflug auf Biella. In Flugplatznähe habe ich Gelegenheit, die Maschine mit dem Sidestick von Hand zu steuern. Sie bewegt sich ein wenig schwerfällig, lässt sich aber präzise steuern. Die Anfluggeschwindigkeit berechnet das Avio NG mit 102 Knoten. Aufsetzen kurz oberhalb der Stallspeed von 69 Knoten – und dann schnell in die Eisen.

Da die Eclipse weder Umkehrschub noch schublimitierende Abdeck-Paddel an den Düsen hat, sind die angekündigten Anti-Skid-Bremsen eine sinnvolle Ergänzung.

Von außen, so erklären die wartenden Kunden, ist die Maschine sehr leise, der Jet klingt ein bisschen wie ein Staubsauger.

Im Dunkel des Abends jetten wir schließlich zurück nach Hamburg. Könnte ich mit Instrument Rating und relativ vielen Stunden auf Bonanza und Cirrus diese Maschine im Single-Pilot-Betrieb meistern? Die Antwort ist ein klares Ja. Das anfangs ungewöhnliche Glascockpit ist mir schon auf dem Rückflug vertraut; an die höheren, aber in Flugplatznähe nicht viel höheren Speeds muss man sich gewöhnen. Doch vor allem geht es darum, die komplexeren Systeme und insbesondere deren Ausfall zu beherrschen – eine Fleißaufgabe.

Für selbst fliegende Eigner und den Werksverkehr ist die kleine, aber schnelle Maschine wie gemacht. Und wenn sie erst die bereits angestrebte und vor der Pleite schon vorhandene EASA-Zulassung hat, wird sie sicher auch für Luftfahrtunternehmen interessant. Bestes Beispiel ist die Crew, die uns noch am Morgen in Hamburg begegnet war: Sie hatte zwei Personen in einer Citation CJ4 nach Dortmund gebracht – ein 30-Minuten-Flug, der mit einer Eclipse sehr viel effizienter gewesen wäre. ❧

TECHNISCHE DATEN

Total Eclipse 500

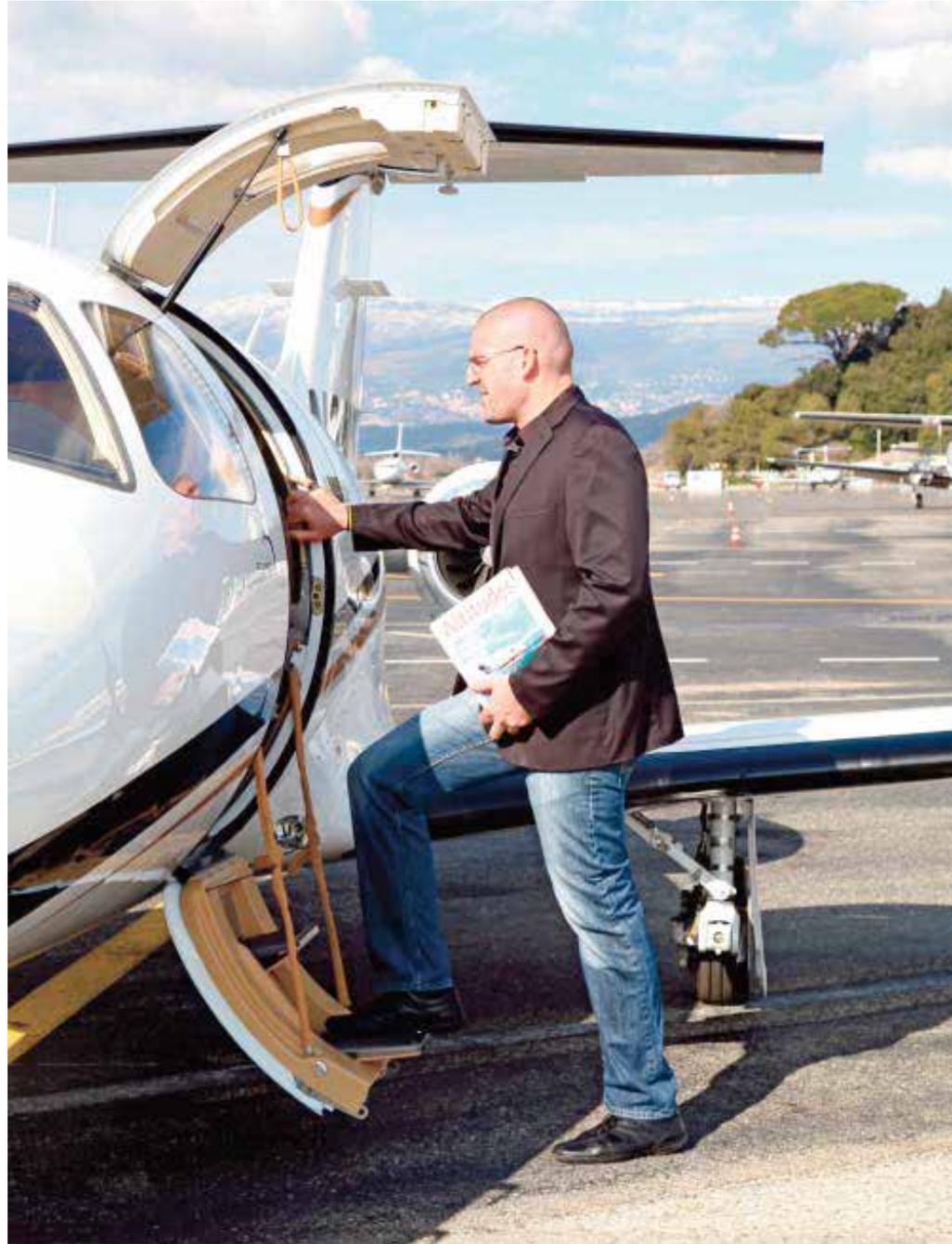
Spannweite	11,60 m
Länge	10,20 m
Höhe	3,36 m
Leermasse	1691 kg
MTOM	2724 kg
MLM	2542 kg
Tankinhalt	770 kg/958 l
Triebwerk/Leistung	2 x Pratt & Whitney Canada PW610F-A/950 lbf
Verbrauch ^{max cruise}	182 kg/225 l pro h
V _{max cruise}	375 kts
V _{mp}	285 kts/0,64 Mach
V _{so}	69 kts
Startstrecke	730 m
Landestrecke	714 m
Preis	2,15 Mio. US-Dollar
Hersteller	Eclipse Aerospace Albuquerque, NM USA
Telefon	001 (877) 375 79 78
Internet	www.eclipseaerospace.net
Europa-Vertrieb	Aeris Aviation Branscombe Großbritannien
Telefon	0044 (12 97) 68 02 59
Internet	www.aerisaviation.co.uk



**ALTITUDE
MAGAZINE**

Altitude Magazine is a high end luxury magazine aimed at the aviation sector. We provided a demonstration flight from Cannes Mandelieu.







The Eclipse TwinJet

The little jet that can

Invited to join the Eclipse jet crew for a demo flight, Altitudes Europe delegated the tallest member in the team to experience the cabin comfort of the three-passenger-seat Very Light Jet, branded as the most fuel-efficient twin-engine jet on the planet.

Fast, affordable and efficient, the Eclipse Jet was designed for people who are in a hurry and want the most flexibility in their decision making on where to go. Whether leaving from an airport high in the mountains or arriving at a small airport in a remote location the Eclipse will get there safely. The flexibility of its cabin configuration allows the aircraft to meet a wide variety of mission profiles. The jet manufactured by Eclipse Aerospace, from Albuquerque, New Mexico features best in class performance, eco-

With low operation costs and a range of up to 1,125 nm, the Eclipse is the ideal personal bizjet for European travellers

nomics and safety. With the ability to fly at altitudes up to 41,000 feet at a max cruise of 430 mph (375 kts/695 km/h), all while consuming 59 gallons of fuel per hour. The two P&W610F engines produce 900 lbs of thrust each, for a total of 1,800 lbs of thrust on a jet whose maximum takeoff weight is only 6,000 lbs. The PW610F turbofan engine has proven to be a major catalyst in creating a new era in business aviation. Specially designed for point-to-point travel in a new generation of light and very light jets, this innovative



**The flexibility of the cabin configuration allows to meet a variety of mission profiles.
“In VIP configuration, it is spacious, even for a 6.2 ft tall passenger!”**

engine offers outstanding performance together with Pratt & Whitney of Canada's trademark dependability. Compact and lightweight, the PW610F is built with half the parts of a conventional turbofan, also making it easy and economical to maintain. It delivers highly fuel-efficient power with low carbon emissions. Friction Stir Welding, a method of airframe construction first implemented by Eclipse, is a smoke-free method of bonding that is ten times faster than manual riveting, and yields a much lighter end product. This method of construction is why the Eclipse Jet is

so fuel-efficient. The aircraft also comes equipped with dual-channel full-authority digital engine control (FADEC) which translates into reduced pilot workload and engine monitoring. The Eclipse also boasts safety features such as Auto Throttles, Dual Integrated Flight Management Systems, Synthetic Vision, and Enhanced Vision, features typically found only in commercial and military aircraft. Reduced Vertical Separation Minimums (RVSM) allow six additional flight levels to be available from altitudes of 29,000 ft to 41,000 ft. This enhances aircraft operating efficiency

by making more fuel/time efficient flight levels available; enhances air traffic control flexibility and provides the potential for enhanced enroute airspace capacity. Priced at U.S.\$ 2,695 Million, the Eclipse Jet has the lowest acquisition cost of any jet on the market today. It also has the lowest operating costs, at U.S.\$ 623/hour or U.S.\$ 1.68/nm. Its range (Max NBAA IFR 100nm alternate, 4 occupants) is 1,125 nm, which makes it the ideal personal business jet for European travellers. The Eclipse 550 first delivery dates are scheduled later this year. ■



L'Eclipse 550 che nel mese di febbraio ha compiuto il tour dimostrativo in Europa; si tratta dell'esemplare con numero di serie 72.

Aerei d'affari
Eclipse Aerospace 550

Provaci ancora, Very Light Jet

Avionica ottimizzata per un solo pilota, prezzo inferiore ai concorrenti Cessna ed Embraer, ma prestazioni simili con costi operativi ridotti. Dopo il salvataggio dell'azienda, comincia la seconda vita del piccolo bireattore che vuole sedurre uomini d'affari e proprietari di turboelica.

testo e foto di Andrea Colombo

La notizia che Eclipse Aerospace avrebbe ripreso la produzione di uno tra i più discussi jet d'affari della storia dell'aviazione era stata diffusa all'Nbaa di Las Vegas del 2011. Pochi ci crederono, invece la produzione è ricominciata e questo VLJ (Very Light Jet) è tornato. L'Eclipse 500, lanciato da Eclipse Aviation nei primi anni Duemila e costruito in 260 esemplari, ora è stato rivisitato e aggiornato per eliminare tutti i "deficit" del passato: si chiama Eclipse 550 e lo incontriamo a Torino in occasione della tappa italiana del tour dimostrativo europeo. Dal 550 è stata poi derivata una variante, semplificata nelle dotazioni, che il marketing ha chiamato Total Eclipse.

La prima novità che abbiamo trovato sul 550 è il suo aggiornamento per operare in condizioni di ghiaccio conosciuto (FkI) fino a a 41.000 ft (era limitato dalla Faa a 33.000), con in aggiunta l'operatività Rvm e Ads-B. L'aereo è dotato di uno scambiatore di calore che riscalda il combustibile prima di essere inviato alla camera di combustione; ma dove non viene fornito il cherosene additivo è sempre necessario aggiungere manualmente il Prist antigelo. Ci sono indicatori OAT (la temperatura dell'aria esterna) sugli schermi PFD e la procedura operativa standard richiede l'azionamento degli impianti anti ghiaccio qualora la OAT sia inferiore a 10 °C con alta

percentuale di umidità. Inoltre, una formazione di ghiaccio visibile sul bordo di attacco di ali o coda, viene contrastata usando un impianto pneumatico ad aria calda. Sul parabrezza anteriore sono visibili due sottili strisce deviatrici d'aria calda che hanno la funzione di antighiaccio ed evitano gli appannamenti. Nella vecchia configurazione, un sistema poco efficiente provocava appannamenti indesiderati. Questo è l'esemplare immatricolato N843TE, costruito nel 2007 con il s/n 000072. Ha 361 ore di volo per 391 cicli, ovvero le volte che è stato pressurizzato, ed è uno dei velivoli completamente aggiornati. La conversione da "500" a "550"

non è un semplice *roving*, ma comporta un processo di diversi mesi nel quale l'Eclipse viene sverniciato e completamente ristrutturato con nuovi interni, avionica e impianti. Ce lo presenta al terminal dell'aviazione generale di Caselle David Hayman, Ceo di Aeris Aviation, nuovo distributore Eclipse in Europa basato sull'aeroporto di Dankswell, nel sudovest dell'Inghilterra. Ad accompagnarlo per il conseguimento del *Type Rating* sul "550" è Jim Kilpatrick, veterano dell'Usaf, pilota con 257 missioni in Vietnam, poi comandante per 34 anni con American Airlines e ora istruttore Eclipse. Inizialmente l'appuntamento era all'Aero Club Torino sulla pista

dell'Aeritalia, aeroporto adatto al piccolo bireattore con costi ridotti e maggiore flessibilità per i passeggeri. Ma la testata della pista 28 (lunga 1.074 metri) ha la soglia spovata di 200 metri, ed essendo la corsa d'atterraggio dell'Eclipse di 2.790 ft (850 metri), i due hanno preferito operare a Torino Caselle. Effettuiamo quindi un volo di 30 minuti da Torino a Torino via Cuneo. Il giro d'ispezione è molto semplice e veloce, gli unici pannelli da aprire sono quelli presenti sulle gondole motore al fine di verificare il livello dell'olio. L'entrata avviene attraverso un portello che si apre in due parti, una verso l'alto, l'altra verso il basso dotata di scalini retrattili, e consente

il facile ingresso in cabina. Una volta dentro siamo colpiti dagli interni, firmati da Bmw Designworks Usa, e dallo spazio, anche se bisogna considerare che questa configurazione presenta un sedile in meno di quella del "500". Siamo 4 a bordo su un totale di 6 posti. La cabina ha un'altezza massima di 127 cm e una larghezza di 142, per 376 cm di lunghezza. In fondo alla fusoliera è presente un'ampia e unica area per i bagagli, il cui limite è 118 kg. Davanti, la separazione tra i posti di pilotaggio e i sedili passeggeri è nulla. L'aereo non è pensato per voli di molte ore né riunioni di lavoro, ed è privo di toilette. L'accensione del *cockpit* nella perna di una delle novità: l'Avio NG IFMS.



(Integrated Flight Management System), aggiornato alla versione 2.0 con visione sintetica, gestione della cartografia (Vir/lfr) e auto-manetta; tutto per ridurre il carico di lavoro del pilota singolo. Il cruscotto, dominato da tre schermi, è molto funzionale, e l'accensione dei motori si ottiene azionando i comandi posti sul pannello sopra la testa del pilota. Al livello degli occhi si gestiscono quindi il *Master Warning*, gli avvisi di incendio e il selettore del *Flight Director*. I due schermi primari (PFD) da 10 pollici danno al pilota i parametri di volo e mostrano in più il selettore di velocità, l'altitudine, il radar Meteo, le impostazioni dell'autopilota, l'anticollisione, la gestione delle frequenze di radio e transponder. L'MFD centrale (Multi Function Display), da 15 pollici invece è diviso in due schermate: quella superiore gestisce un PFD di *back-up*, i motori e i messaggi d'allerta. La sottostante è a sua volta divisa in due parti: a sinistra è possibile visualizzare una moltitudine di pagine sinottiche tra le quali il bilanciamento del carburante, pressurizzazione, *check-list* eccetera, oppure gestire il piano di volo; a destra sono disponibili le mappe Jeppesen nelle quali viene visualizzata la posizione dell'aeroplano. Infine, sotto i PFD sono presenti due tastiere a scomparsa che gestiscono l'IFMS. I comandi sono due *side-stick* con i quali, oltre alla condotta dell'aereo, viene gestita l'attivazione dell'autopilota, il trim dello stabilizzatore e del timone. L'aggiornamento del *software* è molto semplice, si esegue con chiave Usb o direttamente via Web. Per ora è presente un'applicazione per iPad nel quale sono

presenti le *check-list* e, volendo, il pilota può gestire il peso e il bilanciamento in tutte le configurazioni nel giro di pochi secondi.

Partenza facile, ma attenti al freddo

L'accensione dei motori è rapida grazie al sistema elettronico di gestione (Fadec), l'unica cosa di cui si deve preoccupare il pilota è controllare la pagina sinottica della gestione del carburante. Essendo l'Eclipse un aereo totalmente "elettrico", bisogna fare attenzione alle batterie: se la tensione risulta inferiore a 23 volt, o la temperatura dell'olio nei motori è sotto i 5 °C, bisogna avviarli con il generatore esterno. Se l'aeroporto non ne dispone, c'è la possibilità di averne a bordo uno portatile, sacrificando 12 kg di bagagli. Pesiamo al decollo 2.600 kg. La *check-list* post accensione è veloce e include l'immissione nell'IFMS dei dati di peso e bilanciamento, delle velocità caratteristiche e della temperatura esterna. Non è prevista la V1 (Velocità di decisione), ma solo la Vr (Velocità di rotazione) e la Vlo (Velocità target a 50 piedi), che al nostro decollo saranno rispettivamente 88 e 100 kt. Con la prova dei freni siamo pronti. Chiediamo a David se è presente il sistema *anti-skid* sui freni al fine di evitare episodi di *water-logging* in atterraggio o stop forzati per il surriscaldamento dei freni. Risponde che su questo esemplare non è presente e che per averlo si dovrà aspettare finizio della produzione in serie dei nuovi Eclipse 550. La *check-list* predecollo è composta da 7 punti, tra i quali l'assicurarsi che le batterie ricevano meno di 7 A di carica. Una volta che tutto

è configurato, compare in verde un confortante avviso sul pannello centrale: T/O config OK. Diamo manetta e in 560 metri, a 88 kt, stacciamo le ruote da terra impostando la salita non ripida a 2.600 ft/min, livellando quindi a 6.000 ft sulle montagne con prua sud e pilotando manualmente a una velocità di 240 kt, la massima consentita a questa quota. Decisamente ridotta risulta la rumorosità ed è buona la comodità della cabina. Sopra i 200 kt è d'obbligo l'utilizzo dello smorzatore d'imbardata, mentre essendo i *side-stick* collegati alle superfici mobili senza servo comandi, lo sforzo del polso del pilota è considerevole. Non avendo l'opportunità di effettuare un lungo volo, chiediamo a David qualcosa di più circa i parametri riscontrati e che cosa pensa del mercato attuale. Risponde che l'Eclipse è e sarà in futuro il *leader* dei VLJ. Il nuovo IFMS è un copilota virtuale e quindi l'aereo è ben gestibile da un solo pilota. "Le statistiche di Eurocontrol", afferma David, "dicono che nel 2012 più dell'80% dei voli europei con jet privati avevano al massimo 4 passeggeri e una durata non superiore a 2 ore. Ciò significa che l'Eclipse è in grado di soddisfare l'80% delle missioni in Europa. La nostra sfida", continua, "è mostrare alle aziende che con l'Eclipse si può fornire il servizio a una frazione del costo di quello che stanno pagando per i viaggi con i loro jet. Sappiamo che il 550 è più piccolo e privo di alcuni servizi finora considerati indispensabili, ma i CEO di medie e grandi aziende tenderanno a valutare l'acquisto dell'Eclipse per il costo relativamente basso, la possibilità di operare su piste corte - bastano 850 metri - ma senza rinunciare a velocità e quota (375 kt, 694 km/h), autonomia (2.408 km) e consumando in crociera da 185 a 225 l/h". Riguardo a questo ultimo dato ci dobbiamo fidare dei dati dell'azienda, possiamo solo paragonarlo al valore di 900 lb/h di *Fuel Flow* registrato a 4.000 ft a 230 kt. Il prezzo d'acquisto varia da 2 a 3 milioni di dollari secondo gli *optional* installati, i costi d'esercizio sono inferiori a qualsiasi altro jet in commercio, circa 1.300-1.400 euro per ora di volo, un valore che vince anche se paragonato a turboelica come il PC 12 o il TBM 850, più costosi, più lenti e rumorosi. Rientrando a Caselle in procedura lfr, controlliamo la nostra posizione sulla carta Jeppesen (in giallo) dove siamo stabili per ILS 36 a 8 miglia dal contatto, che avviene a 80 kt. Per il 2014 le previsioni di consegna sono di 200 esemplari nel mondo, dei quali 25 in Europa.

cockpit view



Nella foto in alto a sinistra, il cockpit in diretta comunicazione con il resto della cabina passeggeri; si notano il piccolo pannello superiore dei comandi elettrici e lo sportello di emergenza sul lato destro delle sediliere dell'autopilota sono in alluminio saldato con sistema FSU.

Qui sopra, il pannello strumenti con il nuovo sistema integrato IFMS; sotto i display di sinistra e destra (PFD), sono situate due piccole tastiere a scomparsa per la gestione dei piani di volo. I comandi destro delle sediliere dell'autopilota sono in alluminio saldato con sistema FSU.

A destra, la visualizzazione (in verde), prodotta dal sistema IFMS, della posizione dell'Eclipse all'interno della procedura di avvicinamento strumentale per la pista dell'aeroporto di Torino Caselle (ILM ILS Z RWY 36)

Motori	Due turbofan Pratt & Whitney PW 607 da 408 kg di spinta	
Dimensioni e pesi	Lunghezza	10,20 m
	Apertura alare	11,60 m
	Superficie alare	13,42 m ²
	Peso a vuoto	1.618 kg
	Peso max al decollo	2.722 kg
	Peso max all'atterraggio	2.560 kg
	Carico utile	1.089 kg
	Capacità carburante	142/127/376 cm
Prestazioni	Velocità massima	(370 kg) 685 km/h
	Velocità di stallo (full flap)	(73 kg) 135 km/h
	Rateo di salita (M/Gs)	3.456/1.010 ft/min
	Tangenza massima (M/Gs)	12.500/10.668 m
	Capacità carburante	850 litri
	Diff. pressurizzazione (a 12.500 m)	2.438 m
Prezzo	Da 2.685 M. Ucd. se con dotazioni standard	
Dealer Europa	EAI tel. tel. +44 8773757978, www.ECLIPSE.aero	





A sinistra, l'Eclipse del nostro articolo ripreso sul piazzale dell'Aviazione generale di Torino; l'impianto antighiaccio di categoria Fikl (volo in condizioni consolute), visibile nei bordi neri in gomma su semiali e piani di coda, è ora completo e amplia le possibilità operative del piccolo bireattore.



Il sistema di apertura dello sportello, con spie meccaniche (verdi = bloccato), e pomello di sicurezza. L'apertura avviene in due parti, una verso l'alto, l'altra verso il basso con scolini di cortesia integrati.

Sopra, i sedili lasciano solo lo spazio per i bagagli; ma l'abitacolo non dispone di toilette. Di serie la cabina è fornita con cinque sedili, il resto è opzionale e costa 24.950 dollari.

L'errore del passato: ignorare la storia dell'aviazione

Il concetto originale del "Progetto Eclipse", il cui prototipo risale al gennaio 2001, prevedeva l'introduzione di un nuovo modo di costruire aeroplani per l'aviazione d'affari: piccoli (creatori da 5-6 posti con un prezzo d'acquisto e costi operativi molto contenuti), ma con prestazioni (velocità di crociera e altitudine raggiungibile), comunque superiori agli aeromobili con motori a pistoni di fascia alta e ai turboprop. Il "colante tipo" proveniva proprio dall'aviazione generale e non aveva mai posseduto né pilotato un jet. La sfida lanciata da Vern Rabrum, ex dipendente Microsoft, era delle più difficili e il traguardo che si era posto era di far costare l'aereo meno di un milione di dollari. Ma il manager non aveva fatto i conti con quanto insegna la storia dell'aviazione, ovvero che la sicurezza (della qualità delle parti e dei tempi di produzione), deriva dall'affidabilità, e questa dipende dal tempo. Molte cose andarono storte, a cominciare dalla scelta di un motore, inizialmente il nuovo Williams International EJ 22, che non era però in grado di fornire sufficiente spinta rispetto a quella richiesta dalla struttura dell'aeroplano per soddisfare le prestazioni volute e non fu mai sviluppato. Inoltre, Rabrum prevedeva la costruzione in outsourcing (ad aziende esterne), di economie perché scelte in base a questo concetto in ogni parte del mondo, ma dalle quali finì inevitabilmente per dipendere. I fornitori erano

inizialmente dislocati tra California, Giappone e Cina e la loro gestione si rivelò molto più complicata di quanto programmato (tempo simile a quello fatto da Boeing con i B 787 Dreamliner), anche a causa delle tante e inevitabili modifiche al progetto che coinvolgevano a catena queste aziende. Il motore fu sostituito dal PW 610E, più potente ma anche più costoso e asettato, mentre la filiera di fornitori produsse intoppi tali da far saltare il progetto di due anni e triplicare i costi di sviluppo iniziali, che però l'azienda intendeva ammortizzare con grandi volumi di produzione. Nel 2009 il portafoglio ordini sfiorava le 2.000 unità, ma con il fallimento del cliente di lancio, la compagnia aerotaxi Dayjet, e quello di alcuni dei principali - strategici - fornitori, la vicenda Eclipse Aviation diventò un grande flop che si concretizzò il 4 marzo 2009 con la bancarotta dell'azienda e il riacquisto della messa a terra dei 260 aeromobili già in servizio. I piloti però tanto amavano l'aeroplano quanto desideravano l'industria che lo costruiva, e nel settembre dello stesso anno la società fu comprata da Mason Holland, pilota commerciale, uomo d'affari fanatico del "miglioramento continuo", che rivisitò la produzione nello stabilimento di Albuquerque (Nuovo Messico). La sfida da vincere a quel punto era: trovare nuovi finanziatori, rivoluzionare la filiera dei fornitori e implementare il vecchio aeroplano per mantenerlo, se non il prezzo, le promesse di prestazioni. La prima azione di Mason fu comprare

28 aerei dal fallimento Dayjet e progressivamente migliorarli per commercializzare un nuovo velivolo, mentre si materializzò come finanziatore e partner strategico Sikorsky Aircraft, divisione di United Technologies, entrata in società con 25 milioni di dollari. L'accordo non si limitò a fornire liquidità, ma permise di costruire fusoliera, code e semiali presso lo stabilimento polacco PZL, abbattendo i costi di produzione e semplificando il ciclo di lavoro. L'assemblaggio finale invece rimase all'interno degli stabilimenti di Albuquerque. Del pensiero rivoluzionario di Rabrum rimase la produzione delle fusoliera, che appare come un unico pezzo di metallo senza rivestiture grazie alla tecnologia *Rivolution Stir Welding* (fettatura mediante saldatura ad agitazione - stirito), nel quale l'alluminio viene portato allo stato plastico grazie al calore sviluppato dal movimento rotatorio dei pezzi da saldare e dall'ultrasoni, mantenendo pressoché inalterate le caratteristiche meccanico-chimiche originali. Il vantaggio era che la nuova società non doveva recuperare le spese di ricerca e sviluppo, né ottenere la certificazione, già ottenuta separatamente per imitazioni, sia da Eas sia da Easa (quest'ultima scadenza ma che sarà rinnovata a breve). Una delle caratteristiche principali dell'aeroplano, ora garantita, doveva essere raggiungere FL 410 (12.490 m); ma a causa della fretta di produzione, le prime unità non erano dotate di sistema antighiaccio totale e l'Eas limitò la lunghezza massima a FL 300 (9.144 m).

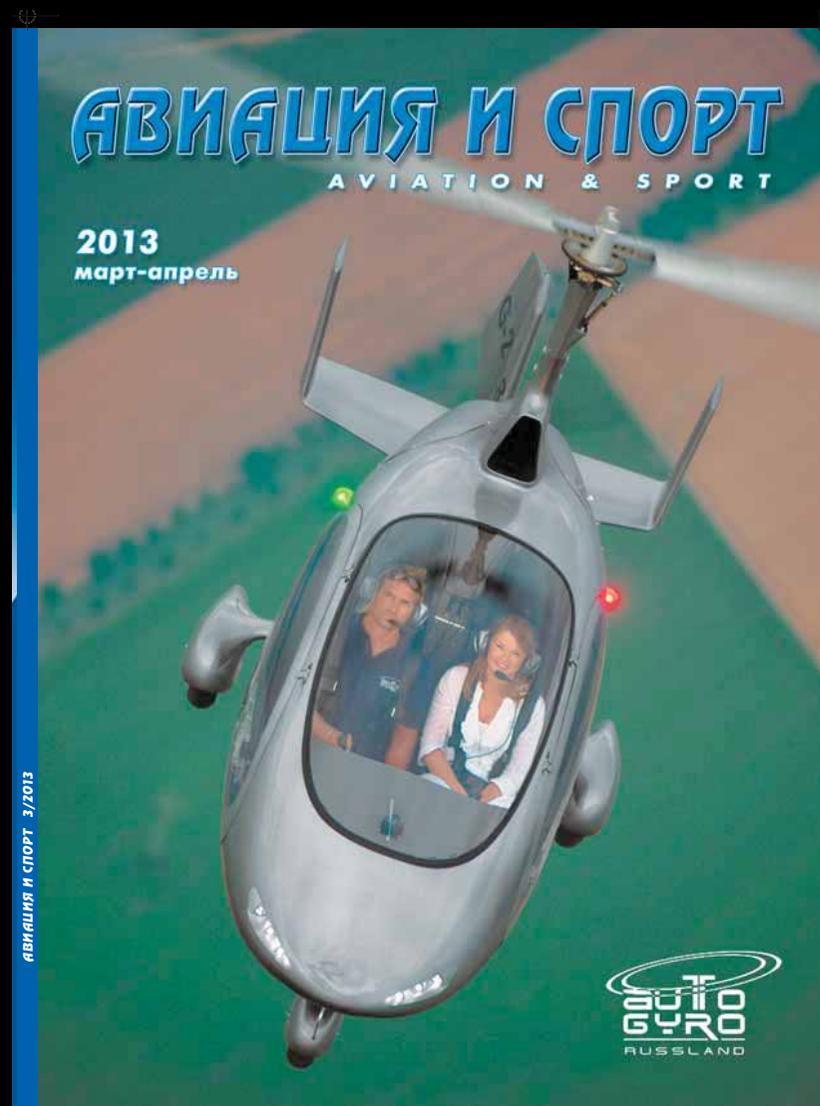


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AVIATION & SPORT

Largest Sport Aviation and General
Aviation Journal in Russia – April
2013 Edition



Suitably fed and watered it was time for me to fly the Eclipse to Blackbushe. The plan was to drop David off to catch a flight to the States to attend his conversion course.

After engine start we completed the checks and programmed the FMS, entering the outside air temperature and completing the weight and balance page.

Our take-off weight was to be 200lb below gross at 5,800lb giving a Vr of 89 knots and V50 of 102 knots. The FMS gave us a take-off N1 of 91.4% and the appropriate numbers came up on the PFDs.

Back-tracking Runway 04 for departure we completed the nine items on the 'Taxi' and 'Before Take-off' check lists before setting the FD to TOGA (Take-off And Go-Around), HDG (Heading) and ALT SEL (Altitude Select) modes to activate the command bars prior to lining up. With the green 'Take-off Configuration OK' caption up we were ready to go.

Holding 'TE on the brakes I increased the power to about 85% N1, checked the temperatures and pressures, released the brakes and advanced the power levers to the forward detent allowing the FADEC (Full-Authority Digital Engine Control) to set and maintain take-off power. With a slight crosswind from the left keeping straight was easy and acceleration brisk. Rotation required a bit more effort than I expected and was about on the nail 2,100 feet down the 3,175 foot runway.

With a positive rate of climb I retracted the gear, on passing V50 brought the power back to max continuous, accelerated to V50 + 20 and at 400 feet retracted the flaps and completed the 'After Take-off' check list. Engaging the autopilot and changing from HDG to NAV mode on the FD I was then able to sit back and try to soak up the information being presented to me by the IFMG. Bearing in mind this was my first experience of the system and Phil had little time on the aircraft I did find it quite a mental challenge. Like all similar modern systems I find they are very good and intuitive in some areas but overly complicated and user unfriendly in others. What is quite apparent is that a thorough IFMS simulator session, as given by EA on the type conversion course, is absolutely essential. Self-teaching is simply asking for trouble, something you don't need on a single-pilot jet.

Levelling off at 5,000 feet with the 'Climb' and 'Cruise' checks complete I set up 85% power to give us the maximum cruise speed of 250 knots for this altitude. Phil opted to remain on QNH rather than 1013 hp as we would soon be descending under the London TMA.

Fuel burn at this setting was in the order of 700 lb/hr much as one would expect at this lower level and still quite frugal given our speed. Peter reported a very quiet cabin and could easily listen in to our chat up front. Crews be warned!

On this short 25 minute sector we were kept quite busy. What with me picking Phil's brains and radar handovers from Yeovilton to Boscombe Down and then Farnborough the work load was high but at the same time made easier by the information presented to us from the IFMS.

Rather than make a straight-in approach to Blackbushe's runway 07 I elected to join overhead to give myself time and a feel for the aircraft in the circuit before making the approach. Most of the 'Approach' and 'Before Landing' checks were completed on the downwind leg including setting up a Vref (final approach speed) of 88 knots on the FMS. As per customary practice I delayed selecting land flap and disconnecting the yaw damper until established on finals. With the gear down and take-off flap selected a circuit speed of 140 knots was flown which was quite comfortable.

Giving myself a leisurely four mile final approach, land flap was selected at 1,000 feet QFE, the yaw damper dis-engaged and the aircraft slowed to Vref + 10. At our weight of just under 5,000 lb a power setting of around 72% held the speed and kept us nicely in the groove.

At 50 feet I retarded the power levers and the speed bled off nicely to give us Vref over the hedge. With a gentle flare and thanks to the trailing link undercarriage I grease it on.Very satisfying.

Without thrust reversers, lift dump, speed brakes or thrust attenuators it's all down to the wheel brakes and those skinny tyres to slow us to taxi speed. Used to having at least two of these devices available to me I did find the deceleration a bit slower than I would liked, but that said we could have stopped in the predicted distance of 2,300 feet had we so wished. Anti-skid is not fitted on 'TE but will be soon available as a retro fit and will be standard on the 550.

We stopped briefly by a Cessna Mustang, David jumped out, waved a cheery goodbye and we taxied out for departure.

Taking off on 07 I turned hard right on track to the west and initially levelled at 2,000 feet to stay below the TMA. The plan was to fly a coupled ILS at Exeter followed by a missed approach and diversion to Dunkeswell. The flight back was smooth and uneventful and soon we were talking to Exeter Approach. With the approach set up on the MFD and the approach plate for Runway 26 depicted we were vectored on to the localiser with the aircraft's position showing green on the screen. A really nice feature, giving full spacial awareness at a glance. The aircraft behaved impeccably on the approach and at DA (Decision Altitude) I pressed the TOGA button while advancing the power levers, raised the gear with a positive rate of climb, re-engaged the auto-pilot and let the aircraft fly the missed approach. All very easy, just what is needed for single-pilot ops.

A short hop and we were back into Dunkeswell, job done.

There was lots more I would have liked to have tried - single-engine work, taking the aircraft to the activation of the stick pusher and a typical high level sector would have all added to the evaluation but time didn't allow for that.

Phil assured me that 'TE performed to the numbers as the type should have all those years ago and I have no reason to doubt that. His experience so far, including the delivery flight across the pond, put fuel burns and true air speeds on the numbers.

Eclipse Aerospace quotes an IFR range with reserves and four occupants of 1,125nm which outperforms the larger Mustang and Phenom 100.

At last the aircraft has come up to the promises. At \$2.15 million for a low time Total Eclipse it is priced way below the competition especially bearing in mind it comes with factory warranty, a new IFMS and other goodies. With The all new Eclipse 550 Jet is a further step forward for the design and is still very competitively priced at \$2.695 million.

In conclusion I enjoyed flying this lovely little aircraft. Despite the niggles it's fun to fly and if you are in the market for a VLJ certainly worth serious consideration.

*Peter Turner
Photos by Peter March.*



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A Total Eclipse?

The design of the Eclipse 500 Very Light Jet (VLJ) grew out of Burt Rutan's Williams V-Jet in the 1990s. To improve the aircraft and put it into production, Eclipse Aviation Corporation was founded in 1998 by former Microsoft executive Vern Raburn, with Bill Gates being a major shareholder.

Having been offered an attractive incentive package in 2000, the company moved to its new facility in Albuquerque, New Mexico.

The original design aim was to produce a low-cost, very light jet that could be flown by pilots with experience on high-performance GA aircraft. It was to be a straightforward and economic aircraft to manufacture and maintain with an initial price less than one million USD. A tall order, despite which most of the aviation industry not only accepted the concept but were mesmerised by it. I have to admit though that I was one of the doubters. The numbers just did not stack up. Eclipse's target was to achieve an order book of 2,000 aircraft a year which represented a huge slice of a market already served by well-established light jets, albeit not VLJs. It simply wasn't going to happen.

Despite this non-refundable deposits started to roll in with early positions selling at for as little as \$800,000. A quarter of the price of the nearest light jet rival!

Construction of the first prototype started in 2001 and it first flew on 26 August 2002.

It quickly became apparent that the Williams International EJ22 engines were too small and not up to the job, as a consequence of which the performance guarantees were unachievable. So they were replaced by Pratt and Whitney PW610F-A turboprops were chosen.

This subsequent engine change required a redesigned airframe which resulted in a produc-

tion delay of two years. The opportunity to make other changes was taken and the re-engineered, improved prototype flew again in 2004, by which time the price had risen to \$1.4 million. Despite this the orders continued to flow in and stood at 2,500 at its peak. Many of these were from start-up air taxi companies like DayJet who ordered an ambitious 1,400.

The basic fact that the aircraft was costing far more to produce than the selling price seemed to go un-noticed and the hype ran on.

In February 2006 the company won the coveted National Aeronautic Association's Collier Trophy for its work with the Eclipse 500. As only the prototype was flying at the time this proved to be a controversial award amongst those in the industry.

FAA certification, with some caveats, was granted on 27 July 2006 followed by the first delivery of a customer aircraft in January 2007. This was followed by EASA certification for private category operation came in November 2008.

While all this was going on Eclipses Wisconsin facility had been designing and building a second, four-seat single engine aircraft initially called the Eclipse Concept Jet. It had been built in complete secrecy at NASA's Wallops Flight Facility in Virginia and first flew on 2 July 2007. It was unveiled, much to everyone's amazement, at EAA Air Venture at Oshkosh just three weeks later. Despite the company declaring they were not going to put it into production they began to take orders and deposits after naming it the Eclipse 400.

By the end of 2007 Eclipse had built 104 Eclipse 500 aircraft but despite this had to lay-off 10% of its workforce and law suits for non-payment to sub-contractors had started.

In mid-2008, as a condition of a desperately needed re-financing package, Vern Raburn resigned as CEO and the finance companies president, Roel Pieper replaced him.

However the respite was short lived and the pack of cards fell very quickly. The 400 project was suspended, the supplier of the 500 tail-planes closed its plant, and the law suits continued. By the end of August 38% of the workforce were laid off and Pratt and Whitney repossessed 24 of its engines. In September DayJet, Eclipses largest customer, ceased operations and in October production was halted. Then on 25 November, just 4 days after announcing EASA certification, the company finally collapsed into bankruptcy.

After lengthy proceedings, Eclipse Aerospace, headed by businessman Mason Holland and a seasoned team of aviation executives- completed their bid for the assets of the old Eclipse company, moved into the Albuquerque facility and recommenced operations on 4 September 2009 as the new company Eclipse Aerospace, Inc.

The new company, now under Holland's control, immediately set about improving the Eclipse Jet. Their plan was to upgrade, totally re-furbish and re-engine the finished aircraft it had acquired, calling it the Total Eclipse. (Under a separate transaction, the new Eclipse Aerospace purchased 26 aircraft from the DayJet fleet which had been repossessed by the original lender). Next, the new production Eclipse 550 Jet would follow on to a higher specification with the completion of the unfinished airframes and full re-opening of the production line and new production deliveries beginning in mid 2013.

Improvements to the Total Eclipse included securing approval to operate flight in known icing conditions and improving the avionics suite

Авиация общего назначения

ENGINE START AND TAXIING

The Eclipse is essentially an all-electric aircraft right down to the gear and flap systems. It is no surprise then that looking after the electrics is all-important and this begins with engine start.

If the battery system is below 23 volts or the outside air temperature below +5 degrees C the Eclipse needs external power for engine start in order to protect the batteries. This can either be provided by either a ground power unit or portable power pack (weighing about 25 lb) which can be carried in the aircraft. Furthermore if the temperature is below -15 degrees C engine start is prohibited to prevent engine damage. It was +3 at Dunkeswell so we plugged in a power pack. With the 'Before Starting' checks complete I fire up the right engine first simply by selecting the appropriate start switch on the overhead panel. From there on it is fully automatic and all I had to do was monitor the electric and fuel synoptic pages. Not a good feature bearing in mind this aircraft is designed for single-pilot operations.

The usual after-start tests and checks are quickly completed including setting weight and balance, v-speeds and outside air temperature data into the system.

Taxiing is straightforward, the nose wheel will caster, which on the positive side, provides a relatively short turning radius, however, care should be taken not to turn too sharply which could prove embarrassing. A properly trained pilot with this aircraft will have no problem with taxi and maneuvering this jet in tight spaces due to the planes overall small footprint.

The pre-take-off check list is short, just seven items one of which is to ensure the batteries are receiving less than 7 amps charge. Once all is complete a 'Take-off Configuration OK' green caption illuminates and you're ready to go. An excellent safety feature.

Phil demonstrated the first take-off. On a short runway with a few remaining damp patches I'm more than happy with that. There is no V1 (decision speed) on the Eclipse, just Vr (rotate) and V50 (50 foot target speed). Phil briefs that he

will abort the take-off for any malfunction before 60 knots and between that and Vr only for a major malfunction, which seemed sensible to me.

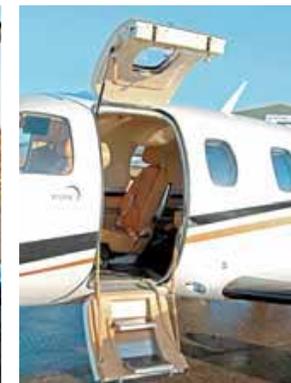
The Cirrus camera ship, owned and flown by David departed ahead of us to an agreed rendezvous at 2,000 feet to the west of Sidmouth. As soon as we are in the cruise Phil hands over to me to get a feel of the Eclipse's handling before forming on the Cirrus for the photography.

The handling is good and precise in all axis, the only minor surprise for me were the side-stick loads which were heavier than I expected, especially in roll. Given the mechanical linkages and small lever arm of the side-stick this is not surprising and I soon got used to it.

Closing on the Cirrus from its rear starboard quarter I suddenly realised I hadn't flown jet formation for quite a while and had a bit of work to do if the job was to be a success. Getting within a few yards to get the required shots is always demanding, more so when your total time on type is only 15 minutes. One problem with holding formation in a jet is the spool up time of the engines which require constant small power adjustments. However this proved much easier than expected due to the quick response of the Pratt and Whitney engines. Despite this, due to the inherent clean airframe of the Eclipse combined with the lack of speed brakes, I did start to overshoot on the first attempt and knocked it off for a another go.

The second attempt was on the ball and we tucked in nicely. A good yardstick for an aircraft's handling characteristics is formation flying and the Eclipse was right on the mark. We were filming downwind of the beautiful South Devon Jurassic Coast and so experienced a little turbulence but it was no problem keeping on station, the Eclipse feeling solid and responsive. I just wish I could have admired the scenery!

With the shots in the bag, I pulled away and let the Cirrus return to Dunkeswell ahead of us so that Peter could disembark to take some approach to land pics. That done Phil carried out a text book short landing and we taxied in for a quick lunch and de-brief in the airport restaurant. And very nice it was too.





LA MANANA

We flew in to LEDA airport for a regional newspaper who covered us on the front page.

FESTIVAL DE CINE
La Berlinale premia a dos mujeres con el Oso de Oro y de Plata, en un certamen que ganó la película rumana 'Pozitia Copilului'



NOY
Revista dominical
XI Semanal



Ros condena el espionaje y exige una "regeneración"

- El nombre del alcalde de Lleida aparece en los 'dossiers' de la agencia de detectives Método 3
- El edil dice que los partidos políticos lo que deben hacer es "escuchar a los ciudadanos"

TRANSPORTE AÉREO



El aeropuerto de Lleida-Alguaire presenta el bioreactor Eclipse 550 para desplazamientos profesionales y de ocio
ALGUAIERÉ • La presentación del jet ligero consistió en tres vuelos de 15 minutos para la veintena de personas que asistieron interesadas. El aparato, con capacidad de cinco pasajeros más el piloto, cuesta dos millones de euros y puede alcanzar una velocidad de 650 kilómetros por hora.

SANIDAD

Unos 10.000 leridanos padecen de fibromialgia

LLEIDA • El Hospital de Santa Maria celebró una jornada que se centró en la repercusión laboral de los pacientes que sufren esta enfermedad, cuyos casos siguen en aumento.

NIEVE

Un alud corta la carretera de Vaqueira al Pla de Beret

PLA DE BERET • Una máquina quitanieves con una turbina y una pala restableció la circulación en la vía sin tener que lamentarse daños.

DEPORTES

El Força Lleida vuelve con una derrota de su visita al Breogán (83-68)

LUGO • Los leridanos sorprendieron en los primeros minutos del choque al desplegar un juego eléctrico, pero sucumbieron tras la reacción de los gallegos.

El juego de los leridanos, ayer de blanco, se fue por los suelos



El equipo de básquet femenino Cadí-ICG pierde en Salamanca con contundencia (74-52)

Leo Messi rescata al Barcelona con dos goles en su visita al campo del Granada (1-2)

FESTIVAL DE CINE

PÁG. 33 ▶

La Berlinale premia a dos mujeres con el Oso de Oro y de Plata, en un certamen que ganó la película rumana 'Pozitia Copilului'



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Revista dominical
XL Semanal



Ros condena el espionaje y exige una "regeneración"

▶ El nombre del alcalde de Lleida aparece en los 'dossiers' de la agencia de detectives Método 3

▶ El edil dice que los partidos políticos lo que deben hacer es "escuchar a los ciudadanos" PÁG. 7 ▶

TRANSPORTE AÉREO



SELENA GARCÍA

El aeropuerto de Lleida-Alguaire presenta el biorreactor Eclipse 550 para desplazamientos profesionales y de ocio

ALGUAIRE • La presentación del jet ligero consistió en tres vuelos de 15 minutos para la veintena de personas que asistieron interesadas. El aparato, con capacidad de cinco pasajeros más el piloto, cuesta dos millones de euros y puede alcanzar una velocidad de 650 kilómetros por hora. PÁG. 9 ▶

SANIDAD

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Un alud corta la carretera de Vaqueira al Pla de Beret

PLA DE BERET • Una máquina quitanieves con una turbina y una pala restableció la circulación en la vía sin tener que lamentarse daños. PÁG. 10 ▶

DEPORTES

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LUGO • Los leridanos sorprendieron en los primeros minutos del choque al desplegar un juego eléctrico, pero sucumbieron tras la reacción de los gallegos. PÁG. 35-36 ▶

El juego de los leridanos, ayer de blanco, se fue por los suelos



LA VOZ DE GALICIA

El equipo de básquet femenino Cadí-ICG pierde en Salamanca con contundencia (74-52) PÁG. 40 ▶

Leo Messi rescata al Barcelona con dos goles en su visita al campo del Granada (1-2) PÁG. 38-39 ▶