

Eclipse outgrowing its teething troubles

by Robert P. Mark

I've been waiting quite some time to fly the Eclipse, a dozen years in fact, since the then revolutionary very light jet (VLJ) was first announced in 1998. The term very light jet—originally coined to describe the Eclipse specifically—came to be applied to a number of small jets, although a precise definition seemed to depend upon an aircraft manufacturer's marketing department at any given time. The assumption was that a VLJ would be small and light. Some thought the term fit the 8,730-pound Cessna Citation Mustang while others applied it to the 10,472-pound Embraer Phenom 100. Of course, neither Cessna nor Embraer called its aircraft a VLJ, preferring the title entry-level jet. Only the 6,000-pound-mtow Eclipse EA-500 seemed to really embody the VLJ philosophy.

Certainly the smallest of the twinjets, the Eclipse is also easily owner-flown at high altitudes and can land and depart from relatively short runways. Only the Eclipse arrived on the scene with a teeny and significantly premature price tag of less than \$1 million when first announced. Eclipse claimed a higher airspeed (370 knots) than the Mustang (340 knots), but it would lag the Phenom (390 knots). It also claimed to be a fuel miser. Both the Mustang and the Phenom deliver cabins larger than the Eclipse's, but those cabins come with much larger price tags and operating costs. All are RVSM-certified, unlike the single-engine jets coming down the line such as the Cirrus Vision or PiperJet.

Cracks Begin To Show

Almost from the first, the Eclipse seemed a bit too good to be true. In mid-2008, the Eclipse line shut down as the company slipped into bankruptcy, while Mustangs and Phenoms continue to roll off the lines of established manufacturers as the orders come in (Cessna did recently slow the Mustang line but expects to have it back up to normal as we go to press).

Troubles for the Eclipse began long before the 2008 bankruptcy, however. Much of the turbulence stemmed from founder and then-CEO Vern Raburn's love/hate relationship with owners and the media. Many critics believe the Eclipse 500 was rushed to

certification with a number of unresolved hardware and software issues in a bid to maintain the ever more demanding cash-flow required to keep the factory doors open. Many aircraft left the line not yet certified for flight into known icing, or with no GPS integrated into the aircraft's navigation system. Owners accepted their aircraft with an IOU entitling them to completion of these and many other items at some unspecified later date. Much of the work was never completed.

Information leaks from within Eclipse's Albuquerque, N.M. manufacturing plant spawned the famous Eclipse Critic blog, which delighted in revealing details about the alleged inner workings of Eclipse Aviation that Raburn and his managers would have preferred had been left unsaid. It was not uncommon for a blog post to draw a hundred comments in a single day. Raburn and his staff never directly responded to what ran on the blog, leaving owners wondering about the accuracy of the posts.

The Eclipse 500's real problem, though, was that all the information from Raburn's office became suspect, to the point that almost no one understood what was happening with the aircraft. Confidence in the aircraft and its support plummeted, as did the hull value of the machines that had already left the assembly line. Certainly from the start, most of the original technical issues were never in question, merely the method and the timing of the repairs. The shutdown of Florida-based DayJet—Eclipse Aviation's largest customer—became the final straw for the company, and the factory halted production in mid-2008. Later plans to reemerge with fresh financing also failed, and the company liquidated early last year. Raburn and other former Eclipse executives were sued by a number of owners who claimed they had been duped. A new iteration of the company—now called Eclipse Aerospace—emerged last fall under the leadership of South Carolina businessman Mason Holland, an original Eclipse deposit holder who lost his \$1 million initial deposit.

The new Eclipse Aerospace promised owners of the 260 airframes in existence that they would finish their aircraft and deliver a



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Eclipse Aerospace is providing support for the 260 very light jets Eclipse Aviation built before its bankruptcy, and its management team—(l to r) Mason Holland, Ken Ross and Mike Press—is considering restarting production.

into truly useful aircraft. Eclipse says that the 1.7 upgrade has eliminated most of the nuisance problems with the airplane. The company also offers aircraft to owners not yet in possession of an Eclipse airframe. The new Total Eclipse—which includes all the 1.7 upgrades—will also carry a new aircraft type ID (the TE-500) to distinguish it from the original airframe.

The only outstanding Eclipse issue is service ceiling. All airframes are currently limited to FL370 due to an engine bleed-air issue that Eclipse believes will be solved soon, although no firm date has been announced. According to Ken Ross, the company's president of service network and support, once that engine issue is fixed, the Eclipse will easily climb to FL410 from takeoff at max weight. The altitude restriction demands only a slight penalty, according to Ross. "If you climb to FL410, you save about 25 pounds of fuel per side per hour." SimCom has been selected as the official factory training organization and both full-motion simulators, built by Opinicus, will be operational in Orlando this fall. □

product like the one Raburn and his team had promoted, no small challenge. The concept of restarting the production line has also been bandied about. Thus far the company has updated seventy-six 1.7 version Eclipse 500s. Owners do have to pay for the upgrades—the old IOUs became invalid after the original Eclipse Aviation went bankrupt.

Holland said he was initially motivated to try and recover some of his money, but quickly realized there were dozens of owners who loved the product but disliked their experience with the old Eclipse Aviation. Holland decided to listen to what owners had to say as he decided the future of Eclipse. "I met more than 300 owners in 27 cities in 15 days." What he tried to impress upon owners was not to lose sight of the fact that this was a revolutionary clean-sheet economical aircraft with 260 completed airframes to date. "Our goal from the start

was to commit to customers on repairing that 15 percent of their aircraft's missing capability and also to deliver the Total Eclipse, the factory-refurbished Eclipse 500 with a factory warranty, for \$2.15 million. There will never again be another twin-engine jet aircraft for less than \$3 million."

The FAA has published a proposed Airworthiness Directive affecting some Eclipse models with the Avio 1.3 and 1.5 version avionics based on reports of uncommanded changes to the communications radio frequency, altitude preselect and/or transponder codes. Holland responded, "It affects only about 30 airplanes. All the others have complied with the SB it relates to, which has been out for almost two years."

Eclipse Aerospace engineers developed a series of upgrades—most recently Version 1.7, which adds Nexrad, approach plates and SafeTaxi—that will turn all modified Eclipse 500 airframes

Mason Holland spoke to a crowd of Eclipse owners at Oshkosh. Read about their experiences at www.ainonline.com/Oshkosh_Eclipse.

The compact Eclipse can seat six passengers—on paper—but it is truly a comfortable four-place airplane.



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Eclipse Aerospace TE-500 – Specifications and Performance

Price (typically completed and equipped)	\$2.15 million
Engines	2 Pratt & Whitney Canada PW610F-A (900 lbs each)
Passengers (typical)	1 crew + 4 pax
Range (w/NBAA reserves, 200-nm alternate)	1,125 nm at Mach 0.58
High-speed cruise	370 ktas/Mach 0.64
Long-range cruise speed	320 ktas/Mach 0.58
Fuel capacity	1,698 lbs
Max payload w/full fuel	695 lbs
Ceiling (certified)	37,000 ft
Cabin altitude at ceiling	5,500 ft
Max takeoff weight	6,000 lbs
Balanced field length at mtow (sea level, standard)	2,394 ft
Landing distance	2,342 ft
Length	33.5 ft
Wingspan	37 ft 11 in
Height	11 ft
Cabin	
Volume	160 cu ft
Width	56 inches
Height	50 inches
Length (seating area)	148 inches
Baggage capacity	16 cu ft, 260 lbs
FAA certification (basis, date)	FAR Part 23, Sept. 2006
Number built (through date)	260 as of 8/9/10

Flying the TE-500

This AIN pilot/reporter had an opportunity to fly the Eclipse on two different occasions, once on a short cross-country trip in March between Chicago and Nashville and again to Rockford, Ill., for some approaches, landings and airwork. My instructor pilot was North American Jet Eclipse instructor Mike Vautell.

As I approached the Eclipse, it was clear once again just how compact the airplane is by today's standards. The aircraft measures just 11 feet from the ground to the top of the tail, 38 feet from wingtip to wingtip and 33 feet from nose to tail. The Beech Baron's wingspan is just under 38 feet and it stands just under 10 feet high. At mtow, the Baron weighs in at 5,500 pounds; the Eclipse weighs 6,000 pounds. Eclipse's friction stir welding process produced a smooth, sleek airframe with only a few items—such as the landing gear and AOA probes—sticking out in the slipstream.

Powered by two Pratt & Whitney Canada PW610F-A turboprops, each pumping out a solid 900 pounds of thrust—950 if the automatic power reserve kicks in on an engine failure—the Eclipse carries a maximum of 1,698 pounds of fuel. The walk-around is light-twin simple as the pilot pulls the chocks, snoops under the fuselage to check the gear and be sure the hard landing indicators are not showing and that the oxygen blowouts have not popped. Oil level checks are just below eye level.

The inside of the aircraft we flew, S/N 255, was beautiful—leather seats—although a bit spartan by some jet standards. This is not a Falcon or a Gulfstream, but it is a clean, attractive design. Our aircraft had five seats, although the type can seat as many as six. I can't believe anyone would jam that many people into the cabin, though. It's simply too tight. This is a solid four-place aircraft and no more, except perhaps on a short trip. Maximum baggage capacity is 260 pounds.

The panel on the Eclipse is well organized and similar to that of a larger jet, with everything, right down to the audio panel, controlled through the multifunction display. Much like the dual Waas-capable Garmin 400Ws, the Avio NG avionics system on the Eclipse translates into lots of button pushing and knob turning. It didn't take long to get used to it though. And of course, the Eclipse's sidestick control gives the pilot plenty of extra space to move around. Pull and turn the start switches and the two tiny Pratt's were soon spinning nicely.

We weighed in at just under 5,500 pounds for takeoff on the run to Rockford for approaches, and about 1,000 pounds of that was fuel. The maximum useful load on an Eclipse is 2,235 pounds. With three hours of fuel—about 1,400 pounds—that leaves room for four people and a little baggage. Under no-wind conditions and ISA up high, the Eclipse could just make Miami from Chicago nonstop. From Aspen on an 80-degree day, the Eclipse will fly to ABQ with four passengers. The aircraft will climb directly to 37,000 and 41,000 off the ground at mtow as well. At 37,000 feet the 8.7-psi differential translates into a 5,500-foot cabin.



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When the first 30 Eclipses were delivered, the front office consisted of the Avio NG avionics suite. The upgraded suite—the 1.5 version with 1.7 upgrades, with which this model was equipped—includes IFR-approved GPS operations and a Garmin 400W.

Takeoff uses the first notch—or 17 degrees—of flaps. With a temperature of 82 degrees F, and the thrust levers firewalled—the Eclipse uses dual Fadecs—the Eclipse sped down Runway 34 at Chicago Executive and was off the ground in less than 2,500 feet. With the gear retracted, it quickly accelerated to about 140 knots for the climb. Chicago departure stopped us at 4,000 and pointed us west, and Rockford Approach assumed control with a block of airspace to handle our airwork. Inside the airplane, the cabin is quiet, even in cruise.

This is an airplane designed to be flown by one pilot.

Everything—gear and light switches and even the icing controls—is easily in reach of the pilot's right hand. But while I loved the smoothness of the Eclipse, I didn't like the sidestick control in lateral movement, at least not this one. The sidestick connects directly with a torque tube that actuates the control surfaces through cables and pulleys. Later in the flight, after a number of steep turns, I found my wrist aching as if I'd somehow been stretching the wrong muscles, by having to flex my wrist at a point just in back of my hand in a way that felt unnatural. Others who fly the Eclipse said they got used to it, but this was about the only thing on the Eclipse I didn't like.

We circled near the Polo VOR (PLL) at 8,000 feet as I cycled the power, dropped flaps and accelerated and slowed a number of times to feel the changes. The airplane seems to know precisely what it needs to do, because pitch changes, even in the stall, were minimal and gentle. If a pilot can handle a Baron or a Cirrus, he can handle an Eclipse. I hand-flew the ILS to Runway 7 at Rockford, and once the power was set there was very little playing with the thrust levers to keep the airplane on the glideslope.

What I found particularly attractive about the airplane were the high operating speeds I was able to hold before I hit the slope, sure to be useful at any busy airport. With a gear and approach-flap speed of 200 knots, it is easy to scream to the marker at 170 knots and still slow for an approach. I tried it and we even easily made a circling turn at about 500 feet agl to Runway 19 at Rockford. Crossing the threshold at 88 knots, the Eclipse took just over 2,300 feet to stop on a dry runway even though it has no thrust reversers or attenuators. That's about what you'd expect in the Beech Baron. I like this little airplane. It should have been the replacement airplane for every light to medium piston twin out there. Perhaps it might yet become just that.

Eclipse operators I spoke with at Oshkosh believe Eclipse will survive. "It will survive because of Mason Holland. Vern [Raburn] was all about being a showman, but he never had a practical business plan for Eclipse. Mason wants to prove the company to customers. I think the new company regularly underpromises and overdelivers. This airplane now represents practical transportation," said John McMurtrie. David Kolsak said, "The new company is run by some really smart people. It has finally developed a fleet of aircraft it can service and support. The Eclipse has finally become the machine I always hoped I'd own."

—R.P.M.