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Here Come the Mini Jets

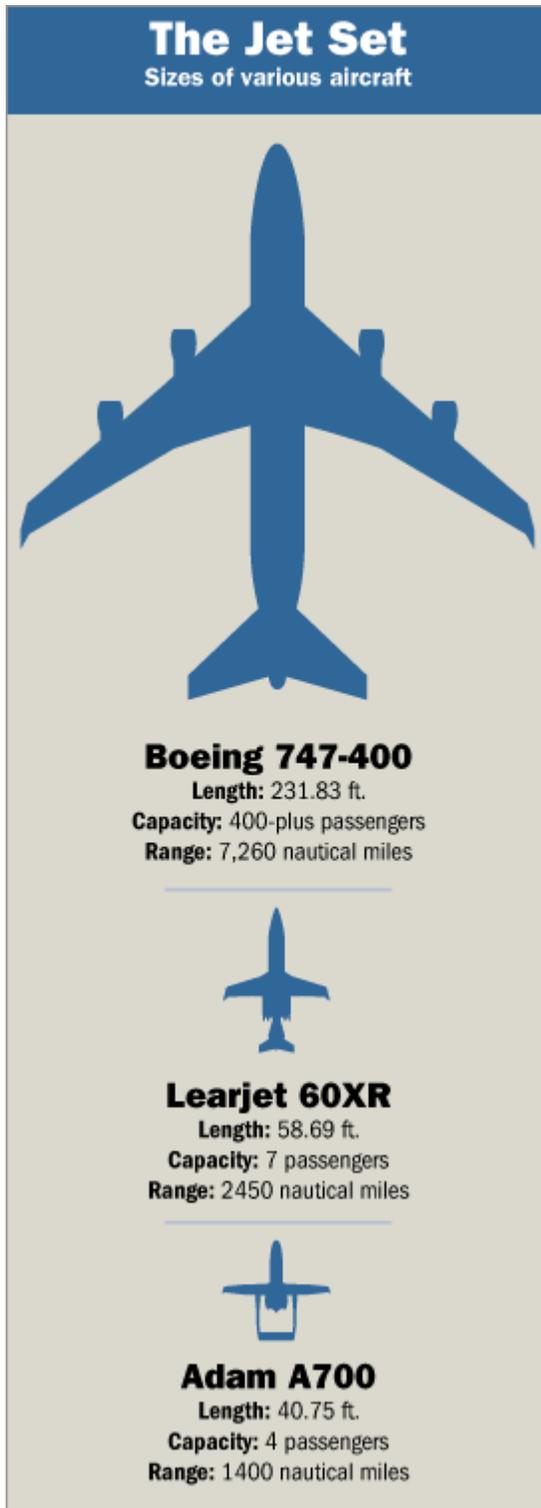
A new breed of plane arrives this fall, promising air-taxi services and jets for smaller companies. Our travel expert – a pilot – became the first to fly all three. What it's like

By SCOTT MCCARTNEY
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ENGLEWOOD, Colo. -- The air-traffic controller wanted to squeeze one jet landing in between two others, a move that requires a bit of precise flying. He asked if I could do it.

"Adam One, can you make short approach?"

No problem, I nodded to my co-pilot, who radioed our acceptance. I swung the plane into a tight turn, lowered the landing gear, tried to lose both altitude and airspeed quickly and pointed the plane into the wind at an angle to the runway. With just 60 minutes at the controls of this plane, I greased the landing.



I was flying a small jet, the Adam Aircraft A700, which is part of a new breed of less-expensive "Very Light Jets" that will make private-jet flying available to many more people, from business travelers and weekend escapists to private pilots who want something faster and jazzier than their propeller planes.

With three VLJ models in production, two of which will begin deliveries in the next few months, and more than 3,100 orders on the books, I wanted to test-fly these new birds -- both as this paper's travel columnist and also as a private pilot. I became the first person to fly all three, the manufacturers say, and what I learned is that all three were incredibly easy to fly -- once you squeeze in.

I also sat in the back seat to see what it will be like for high-dollar passengers of new air-taxi services planning to use these jets by the hundreds. Some seats can be pretty roomy; some can be as cramped as the back seat of a Volkswagen Beetle. And you'd better make sure you use the bathroom before you get on board.

VLJs won't revolutionize air travel, but they will create new options for travelers. They are no substitute for airlines -- moving people two at a time likely won't eat much into traffic aboard big Boeings or, for that matter, 50-seat regional jets that have boomed in recent years. And they won't replace Gulfstreams and Learjets for big companies -- they often need the range and size of those corporate jets.

But VLJs could eat into the fractional jet business, where wealthy people buy a piece of a corporate jet and get to use it for a set number of hours per year. They likely will be an alternative for the corporate fleets of big companies, a cheaper way



to send an executive to a meeting 500 miles away than using a bigger jet with transcontinental range. Cost to own and fly a VLJ: roughly \$2 to \$6 a mile or more, per person; coach tickets average roughly 10 cents per mile.

Already they are enticing a few medium-size companies like law firms and ad agencies to get their own corporate planes, and entrepreneurs who fly themselves for work and play.

About half the orders so far have come from companies that want to start air-taxi service -- flying people to sales calls in small towns without the hassle of long drives or lengthy airline connections or taking a golf foursome to Hilton Head or Vegas for the weekend. Air-taxi entrepreneurs have different models for scheduling and pricing, and it's not clear which idea, if any, will prove profitable. But lots of jets will be flying around trying to make it work.



Interior of the Adam A700

Nothing about the design of VLJs is so radical as to suggest any new safety concerns, and all are subjected to rigorous testing before they get government certification. But one thing that is different is who will be flying them -- the jet cockpit now is more open to less-experienced pilots, and that will bear watching.

On my test flight of the Adam A700, I put the plane through some steep turns, slow flight and stalls to see how it performed. Though faster to climb and cruise, the takeoffs and landings were a lot like flying my Cirrus single-engine prop plane.

The Adam jet and competitors from Eclipse Aviation and Cessna Aircraft are designed as easy-to-fly, stable jets, with similar approach and landing speeds as propeller-plane pilots are used to. The hope is that less experienced pilots can now step right into jets, with about two weeks of training. These planes even use cockpit instruments that are the same as what's being installed today in propeller planes.

They are also cheaper than today's existing business jets. The Cessna Mustang costs about \$2.6 million, 50% less than the cost of the smallest Cessna Citation. The Adam A700 has a sticker price of \$2.25 million. The Eclipse 500 is just \$1.5 million. Already, Eclipse has orders for more than 2,500 jets. That's double the number of jets Cessna has delivered in the past six years. Both Cessna and Eclipse expect to begin delivering jets late this year or early next year; Adam has further to go on winning Federal Aviation Administration certification.

IN FLIGHT

- The Wall Street Journal's Scott McCartney discusses changes in the corporate-jet market. ([Podcast](#))¹

- See the [planes](#)² different companies and VIPs fly.

More VLJs are coming. Embraer Aircraft Holding, a Brazilian maker known for its regional airline jets, has taken more than 235 firm orders for its small jets, which won't start flight testing until the middle of next year. Honda Motor is getting into the airplane business with a HondaJet, a prototype of which has been flying since December 2003. Diamond Aircraft Industries of Canada unveiled a five-seat "personal jet" in July priced at \$1.4 million. Cirrus Design, maker of a hot-selling sleek propeller plane, is studying a single-engine jet with a safety parachute for the entire plane. Price: \$1 million, Cirrus hopes.

New engines make all this possible -- smaller versions of corporate-jet engines that are less expensive. There are some new manufacturing techniques in each plane, and less expensive cockpit computers hold the cost down. Designers have stripped off fancy hydraulic systems and other things that add cost. The planes don't quite have the same speed and range as a corporate jet, and few of the cabin amenities. There's no electrical outlet for a coffee pot, for example -- take a carafe. There are not a lot of options or customization -- you can have any color you want as long as it's white.

For a sense of what it's like on board, let's start in the back. As on any Boeing or Airbus airliner, the ride up front is a lot better than that in the back in these jets. As their name implies, VLJs have very small cabins.

One drawback to the small jets is that with full fuel tanks, each plane can carry only about 700-800 pounds of passengers, pilots and suitcases. That means a golf foursome had better be pretty skinny, without much luggage. If you're going only 600 miles, however, you can fill the tanks halfway and have 1,300 pounds or more of people and payload -- plenty to take the family to the coast for the weekend, or several executives to a customer that otherwise might be a 10-hour drive or a daylong hassle of connecting airline flights and rental-car drive.

The Eclipse has the smallest cabin of the lot. With only 160 cubic feet of volume, the interior is 20% smaller than the inside of a Honda Odyssey minivan. The Eclipse has no separate luggage compartments -- pile your suitcases and golf clubs in the passenger cabin.



That's part of the charm of VLJs -- smaller cabins allow jets to have smaller engines, which burn less fuel, and fly farther than they would with a taller, wider cabin. Small size keeps the price down. Eclipse, the cheapest of the VLJs thus far, notes that it has the smallest cabin and yet 10 times as many orders as Cessna.

Cockpit of the Cessna Mustang

Eclipse installs three passenger seats in its normal configuration -- you can add a fourth seat, but it's a very tight squeeze in the back row, and you'd lose luggage space. The front two seats of the passenger cabin have fairly good legroom once the pilots move their seats forward. Eclipse says it's equivalent to a 34-inch seat pitch on an airliner -- about what you get from Southwest Airlines. But you sit very low to the floor and the tube is far more confining than any Boeing you might be used to.

The back seat is a tough sell for most adults, with about two inches less legroom. It will remind you of sitting on a floor cushion at a Japanese restaurant. Even scooting around the cabin can be a challenge -- hunched over and head down, my shoulders scraped the ceiling, which is 4-foot-2 above the floor at its highest point.

The Adam cabin is 50% bigger in volume than Eclipse and the roomiest of the three, the result of a unique design that has a U-shaped tail. Adam, which has more than 400 orders for its jet, has five passenger seats behind the cockpit, plus a baggage compartment in the nose that can hold four sets of golf clubs.

Adam has a "honey bucket" potty in the back (a bowl with blue fluid), plus a "relief tube" for boys built into the side wall. You can pull a partition up for privacy, but you'd better all be pretty good friends. In the Mustang, there's an "emergency potty" (Read: dry bucket) along with a curtain that fans open for some modesty and a zip-close bag for carry-out. The bowl is right behind the co-pilot's seat, in front of the other passengers rather than in the back, so you'd better all be *very* good friends.

The Eclipse jet doesn't have a potty. Vern Raburn, Eclipse's chief executive, says most trips in his airplane will be one to two hours, so a toilet isn't needed. "When Mercedes offers a lav, we'll consider it," says Mr. Raburn. "Right now, people are voting their dollars and their orders. People don't think they need a lav."

CESSNA MUSTANG

Despite the primitive potty, the Cessna Mustang is the Lexus of the breed, with four passenger seats in addition to the two seats in the cockpit, the tallest cabin of the bunch and big oval windows reminiscent of a Gulfstream cabin. The Mustang costs more, but the polish and finish of Cessna is evident throughout the elegant little plane, and one appeal for buyers is the backing of giant Cessna rather than a start-

up company.



The Cessna Mustang picks up the load.

The Mustang has four passenger seats and luggage compartments both in the front and back of the jet. To make it easy and cheaper to fly, Cessna has simplified systems considerably. Instead of one system to pressurize the cabin and an emergency backup, for example, the Mustang has two independent systems -- each can do the job. If one fails, the pilot doesn't have to throw a switch -- the other system automatically

For takeoff, simply push throttles all the way forward -- a computer sets an appropriate fan speed. Without that, jet pilots have to look down at instruments as they push throttles to the exact right position to get engines rotating at proper speed for that particular takeoff.

It's a docile plane -- a cruiser. You put it in drive and go. Like other VLJs, it's a quieter plane than bigger jets. For its size, it does have lots of power -- it will throw your butt into back of seat with impressive takeoff thrust, something the other VLJs didn't do when I hit the gas.

And yet, its wings are shaped for stability and slow-speed handling. On takeoff, you rotate the jet off the runway at a mere 80 knots. A Learjet may rotate at 120 knots, but the Mustang is much closer to my Cirrus propeller plane, which takes off at 75 knots.

On my first landing in the Mustang, I fell into the typical jet trap and got a little low, then pushed the throttles forward and experienced the jet delay in power. A propeller can throw more air over wings instantly, creating lift. But a jet engine has a lag -- the turbine spools up, creating more thrust and pushing the plane forward to get more air over the wings. Takes a few seconds.

When the thrust kicked in, I found myself speeding up too much. I crossed the runway threshold a bit too fast, so the plane floated just a few feet off the ground. The jet bounced, sparking deep pilot depression until I reminded myself that even though I have 650 hours in my logbook, this was my first jet landing (except for some simulator work), and I've been on plenty of airline flights where the pilot bounced the landing. By the fourth landing, I've learned to slow the airplane down and ease it onto the runway.

As easy as it seems, there is a lot to learn. The FAA is concerned about inexperienced pilots and is taking a hard look at the training programs offered to be certified to fly these new jets. (I flew with company pilots in command.)

Traditionally, pilots have hundreds if not thousands of hours of experience before they fly jets. But these planes can be bought by brand-new pilots who may never have flown a jet.

The hardest part of moving up to a jet, says longtime aviation instructor Martha King, is getting used to faster speeds. "It's like transition from city streets to a freeway. You need to be a little sharper and crisper," she said.

ADAM A700

One day after flying the Mustang, I was in the left seat of the Adam, the SUV of the breed. It's based on a design by aerospace engineer Burt Rutan, who built the first plane to circle the globe without refueling and the first privately funded plane to fly a human into space and back. He gave the Adam a big wide twin-boom tail and a 14-foot-wide wheel base, which makes it feel like you are flying a much bigger jet. It's heavier, too, weighing 5,550 pounds when empty, 2,000 pounds more than the Eclipse. Think of it as a flying catamaran.



The jet is made out of composite material -- super-strong carbon-fiber plastic, which is the same material Cirrus uses in its planes and Boeing will use in its new 787 wide-body jet. Composites can be stronger than aluminum and is easier to shape into aerodynamic curves, with no rivets to disrupt airflow. That makes it cleaner through the air, and faster.

The Adam A700

The twin-boom design has raised a concern with the FAA during certification testing -- if an engine blew apart, could red-hot metal parts break one of the side booms, possibly making the aircraft unflyable? Adam says it has moved all electronics out of the way and put flight-control cables in both booms so that if engine parts pierced one, the other would work. The company is convinced that when the FAA tests it, the boom will stay on and the plane will remain flyable.

The company, founded by high-tech entrepreneur Rick Adam, who put \$26 million of his own money in, has attracted investments from Goldman Sachs, the Hunt family of Dallas and DCM, a venture-capital firm.

Like Mr. Raburn, Mr. Adam is a pilot himself who was bewildered that his profession -- the tech industry -- saw incredible advances from the 1960s through the 1990s, and yet in aviation, nothing had changed. He set out to bring new technology development to airplanes to enhance safety and simplicity. The fuel system, for instance, is a no-brainer -- pilots don't have to switch tanks or worry about keeping airplane balanced.

The Adam A700 isn't as polished as the Cessna. The avionics in the cockpit are not as fully automated -- there is a bit more to think about. The Cessna feels very Cadillac Escalade; the Adam more GMC Yukon Denali.

ECLIPSE 500

Neither one is as responsive as the Eclipse. It's the nimblest of the three jets, rolling easily into steep turns, climbing impressively on just one engine on a warm New Mexico desert day. It has the feel of a sports car, both in the front seats flying the plane, and in the back seats riding as passengers. When I needed to move quickly out of the way of a glider near Moriarty, N.M., the plane jumped through the air.

The Eclipse 500 doesn't have as wide a wheelbase as the other jets, so it's a bit more tipsy on landing. But what's most remarkable is the landing speed -- you cross the runway threshold at 90 knots -- about the same as my Cirrus. Slower speeds make it easier to land smoothly, and likely will prevent accidents like running off the end or the side of a runway.

Eclipse, which started the VLJ parade and managed to raise \$600 million selling its new concept to investors, has received provisional certification from the FAA, which means a couple of issues still have to be resolved.

The biggest is the avionics system -- the displays, radios, satellite navigation gear and software in the cockpit. Mr. Raburn, a former Microsoft executive, wanted to take a standard cockpit system used today in several new planes, including the Adam, and make it much better. But the system, which Eclipse calls "Avio," creates a new level of complexity, and all the components don't work together yet. The first airplanes will be delivered to customers without the satellite navigation system working, for example -- Eclipse will give customers a hand-held Garmin satellite navigation unit.

Eventually, Mr. Raburn says it will all work. But it has the air of the early days of the personal-computer business, when software companies made grand promises and customers found frustration when bugs bedeviled their machines.

What's similar to the software business, Mr. Raburn says, is that after decades of hardly any innovation in private aircraft, several companies are inventing new, useful products and driving prices down. "It's more for less," he says. "If we do this, we become a viable transportation alternative."

Write to Scott McCartney at middleseat@wsj.com³

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