

Cessna's CJ (CitationJet)
line of small business jets
has just grown by one

more airplane. By the time you read this, Cessna's newest CJ—the CJ3—should have been certificated, and the first customers will soon take delivery. The CJ3 is a larger, more powerful outgrowth of its predecessor design, the CJ2, and is the current flagship of the CJ fleet. Compared to the CJ2, the CJ3's wingspan is three feet longer, its overall fuselage length is three feet longer, it has a maximum takeoff weight 1,570 pounds higher, and its Williams International FJ44-3A engines have 380 more pounds of thrust than those of the CJ2.

As a derivative, the CJ3 shares a lot with both the CJ1 and CJ2, and even the original CJ, which was introduced in 1993. And yes, the CJ3, to be certified under FAR Part 23's Commuter category, will have approval for single-pilot operations, like the other CitationJets—even though 50 percent of CJ owners opt for two pilots up front.

To the untrained eye, CJs 1, -2, and -3 may look the same, what with the same basic avionics suite, the same interior seating configuration, and

Cessna Citation CJ3

CJ3: Upping the ante

417 knots for 1,771 nm:
Big numbers for a 'small' jet

BY THOMAS A. HORNE

PHOTOGRAPHY BY MIKE FIZER





similar systems. But Cessna listened to its 719-strong CJ customer base, and used the CJ3 to improve on the earlier models. In many cases, the most popular options on previous CJs were made standard on the CJ3.

One big upgrade was RVSM (reduced vertical separation minimums) capability from the factory. This involves the installation of a third pitot-static system, plus other upgrades necessary for the most accurate altitude information. Customers still are responsible for the in-flight height-measurement tests required for full RVSM approval, but this can be done through one of Cessna's many service centers. RVSM approval—which lets pilots operating between Flight Level (FL) 290 and FL410 fly at 1,000-foot vertical separation minimums—opens up high-altitude airspace to more users, and plans are to make it mandatory for those wanting to

fly in that altitude band over the United States after January 20, 2005.

To preserve traditional CJ handling characteristics in a larger, heavier airplane, Cessna gave the CJ3 a 21-inch-wider wing spar center section than the CJ2's. This let engineers enlarge the flap span by 21 inches and stretch the wingspan as well. The ailerons were given bigger leading edge radiuses, in effect closing the distance from the wing trailing edges ahead of them, and they act as aileron gap seals. To facilitate aileron rigging, there are independent control runs; now a rigging change can be made to one aileron without affecting the other. Finally, the inboard edges of the ailerons have small fences. These boost air flow over the ailerons and enhance stability and control power in steep turns and slips at high altitudes.

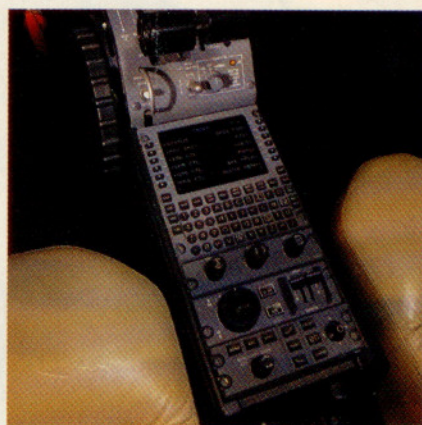
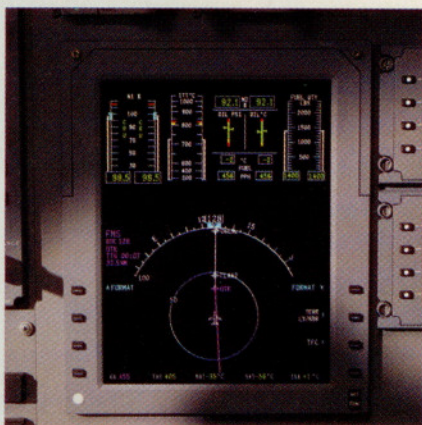
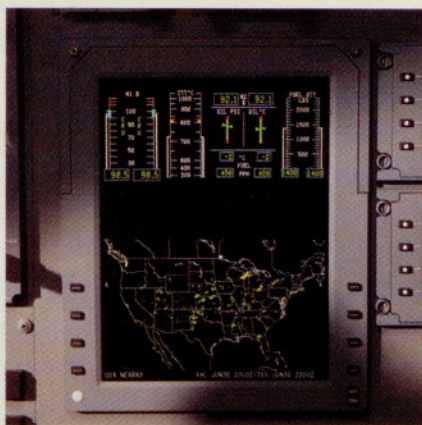
Rudder forces are lighter than previous CJs because a centering

spring and rudder servo tab were eliminated. The CJ3's larger vertical stabilizer obviated the need for this hardware, and the result is immediately apparent the first time you power away from the chocks and feel the sensitivity of the ground steering through the rudder pedals. There are dual-path rudder cables, too. If one cable run binds or otherwise fails, the other will continue to provide rudder control.

There are several other changes worthy of mention:

Gone are the thrust attenuators that used to distinguish previous CJs. With the CJ3's heavier weight, and with the idle and residual thrust levels reduced by the Williams' dual-channel full-authority digital engine controls (FADECs), the airplane rolls to a stop quicker, and attenuators aren't needed for ground operations.

The standard panel has a Collins Pro Line 21 setup with dual radio tuning units, located to the right of the central multifunction display (MFD). The flap handle (the rightmost lever on the control pedestal) can be used to select a full-down, "lift-dump" setting for maximum stopping power. This extends the flaps to 55 degrees, and simultaneously deploys the ground spoilers.



The MFD can be used to display datalink weather (top left), JeppView charts (top right), or show plan views of navigation information (above, left). Engine and fuel information fills the top of the MFD screen. The flight management system is a single Rockwell Collins FMS-3000. It can calculate V-speeds based on weight and atmospheric conditions, then post them on the pilots' primary flight displays (PFDs).

Increased-diameter bleed-air supply lines provide more hot air for anti-icing of the longer wings.

A new precooler, heat exchanger, and a "max cool" valve increases air flow in the cabin for better heating or cooling.

The cabin can accommodate up to eight seats, if a side-facing front seat is substituted for a refreshment console. A six-seat, single-club cabin configuration is standard.

A new digital anti-skid system pairs main wheel braking forces. After touch-down, there's none of the darting or grabbing that so often occurred in earlier CJs' independent-wheel braking.

A Rockwell-Collins FMS-3000 is standard equipment, and is capable of vertical guidance, auto-tuning of localizer frequencies, and automatically calculating and posting V-speeds on the primary flight display. Takeoff and

landing distances, along with fuel and range performance also can be calculated based on the airplane's weight, atmospheric conditions, and other variables. JeppView electronic charts—an option—also can be integrated with the flight management system's (FMS's) flight-plan information, and displayed on the central multifunction display (MFD).

Datalinked graphic weather from XM Satellite Radio or Universal Weather and Aviation are options that let you put Nexrad radar and other weather information on the airplane's MFD.

A traffic alert and collision avoidance system (TCAS) is another standard feature. It's a TCAS 1 unit—an L3 Skywatch HP. A Goodrich Class B TAWS (terrain awareness and warning system) with GPWS (ground proximity warning system) functions is also standard. This sounds an alert if descent

rates are too high, if the airplane sinks after takeoff, or if a collision with terrain is predicted by the unit. It makes altitude callouts, too. This feature anticipates the March 29, 2005, mandatory TAWS rule for turbine-powered airplanes with six or more seats.

Start-up and taxi

Like all newer Citations, starting is a matter of pushing a button. Light-off and generator activation are all part of the automatic start sequence, so all you have to do is watch that interturbine engine temperatures (ITTs) don't surge too high. That's unlikely, since the FADEC's fuel metering already makes for 200-degree-cooler battery starts than those typically experienced on earlier CJs.

Once the Collins Pro Line 21's three 8-by-10-inch display screens power up and initialize, it's time to taxi. Rudder steering is as light as that found on big



piston singles, and if you need to slow down, just go to idle thrust. The airplane quickly slows, but if you really need to brake, get on the binders, and you'll stop on a dime.

Takeoff and climb

The thrust levers slide into three positions—takeoff (TO), max continuous thrust (MCT), and cruise (CRU). For takeoff, just advance the levers to the

A six-seat cabin is standard, but with a belted potty the CJ3 can have eight seats. The biggest of the CJs, the CJ3 is also the fastest and has the longest legs.

TO position and hang on. After takeoff, slide the levers into the MCT positions. The FADEC sets the right amount of power for the atmospheric conditions during the entire climb—all the while making sure that engine temperature limitations aren't violated.

The day of my flight with Jim Martin, Cessna's senior flight test engineer, the airplane weighed 11,300 pounds—2,570 pounds below the 13,870-pound max takeoff weight—and with 15 degrees of flaps the preliminary information indicated a V_1 (takeoff decision speed) of 95 KIAS, and a takeoff distance of about 2,700 feet. We used Wichita Mid-Continent Airport's Runway 32, a short taxi from Cessna's Citation Delivery Center.



The power went up, the runway sped by, V_1 came and went, and soon we were in a 140-KIAS climb with a 22-degree-high deck angle. This is a maximum-climb-rate airspeed (200 to 250 knots is more typical), but the point was made: Initial climb rates at heavy weights could reach 5,500 fpm.

We timed the climb on our way to FL430. It was six minutes to climb to FL250, 8.5 minutes to FL300, and 19

minutes to FL430. How much excess power can the Williams engines make? Passing through FL350, we were still climbing at 1,700 fpm, doing 203 KIAS.

High-speed cruise

At high-speed cruise power at FL430 and temperatures four degrees higher than standard, the CJ3 sped along at 413 KTAS burning fuel at a rate of 740 total pounds per hour, or about 111

Like other CJs, the CJ3 has fold-down entry stairs and a forward refreshment center, part of which can be substituted for a side-facing seat.

gallons per hour. Martin cautioned that the airplane was still in the experimental category, and its final performance figures had yet to be tallied. Still, he said that the airplane was beating the numbers Cessna had originally posted, and that times to climb, in particular, should be significantly shorter than the numbers that have been listed in early promotional materials.

Airwork

After descending to 14,000 feet, gear and flaps were extended and I rolled into a 30-degree bank for the first of several full stalls. The airplane bucked and shook, and the stick shaker rattled the control column (there is no stick pusher), but there was no tendency to drop a wing and recoveries were uncomplicated. Just add a gob of power and the commotion goes away.

To demonstrate single-engine climb performance, we slowed to 115 knots with gear extended and 15 degrees of flaps (takeoff position) and began a climb. Martin pulled back a thrust lever to simulate an engine failure. This triggered the rudder bias system, which automatically deflects the rudder to compensate for engine-out yaw forces. At a V_2 (takeoff safety speed) of 120 KIAS, the CJ3 climbed away at 1,500 fpm. Not bad for 14,000 feet.

Landings

On final, with gear down and 35 degrees of flaps, power was set to 60-percent, some nose-up trim was dialed in, and the result was a V_{ref} of 105 knots and a 0.6 angle of attack. This is pretty typical of all Citations, and so was the subsequent landing. Squeeze off power over the threshold, hold a slight nose-high attitude, wait for the runway, then roll it on at about 90 knots. Graceful arrivals are a snap, thanks to the trailing-link landing gear.

Once the nosewheel meets the runway, get on the brakes. There are no thrust reversers on the CJ3, so I guess Cessna figures the brakes have enough power to do the job on their own.

And they're right. One landing was a maximum performance effort, with the goal of stopping smartly. After I planted the airplane this time, Martin ran the flap control all the way down to the 55-degree "lift-dump" position

A longer wingspan, digital engine controls and more powerful engines make the CJ3 the flagship of Cessna's small-jet fleet.

while I did my best to lock up the brakes. Lift-dump not only extends the flaps to their greatest deflection—it also simultaneously deploys the spoilers. Try as I did, the brakes grabbed without sliding the tires and we stopped in a breathtakingly short distance. We figured it was about 2,200 feet.

Cessna appears to have done it again: Found yet another niche for yet another Citation. Never mind that it has a \$6 million price tag. So far, some 100 orders already have been placed for

CJ3s; 25 of these are for Cessna's CitationShares fractional ownership fleet. And while it's important to talk about its new technologies and improved performance, the CJ3 will no doubt



prove once more that it's the easy, predictable handling, so consistent throughout the Citation fleet, that's most likely to cinch a sale. That, and the strong service network. It's an airplane for those wanting more speed, range, and payload than smaller CJs, but who still want a small-jet feel and

the choice of flying single-pilot. It's a formula that's worked every time before, and one that will probably work once more. This raises a speculation: Can a CJ4 be far behind?

AOPA

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i Links to additional information about CitationJets may be found on AOPA Online (www.aopa.org/pilot/links.shtml). Keyword search: Cessna.

First-time jet pilot BY RICH KARLGAARD

"This is the payoff for earning your ticket," said John Reimer, the Cessna demonstration pilot. We were lined up on Runway 1 at Wichita Mid-Continent Airport. It was just after sunrise, the air outside was pregnant and sweet, and we were trying to beat a thunderstorm rolling down from Nebraska. This is the moment I love in flying, the day's first takeoff. All worldly cares vanish except for that of making a smooth departure. But this morning's takeoff would have an odd twist to it. I would be doing it in a jet.

A jet!

Understand here that my pilot background is modest: I earned a private pilot certificate in 2001, got my instrument rating a year later, and have accumulated 490 hours total, most of it in Cessna 172s and 182s. My idea of a fast airplane is a Lancair Columbia 300, in which I have a half an hour of time.

The jet I was about to fly off the runway is Cessna's smallest, the five-passenger CitationJet CJ1. A brand-new one goes for \$4 million and cruises at 381 knots and flies as high as 41,000 feet. It drinks less fuel than most turboprops and gets you half the length of the United States before a fuel stop. While the world awaits the arrival of smaller, cheaper jets such as the Eclipse 500, Adam A700, and



Cessna's own Mustang, the CJ1 is the reigning bantam champ.

Feet on the brakes, I followed Reimer's instructions to bring the power up to takeoff level, my cue being a Collins Pro Line 21 computer display on the panel. Then it was feet off and we accelerated like a dragster down the pavement. My own airplane, a 2002-model Cessna T182T, rotates at about 60 knots with 10 degrees of flaps. But 65 knots is OK with no flaps, and so is a 55-knot yank if you had bothered to throw down 20 degrees. Flying the CJ1 is not like that. The V_R (rotation) and V_{REF} (approach) speeds are precise. I once rode in John and Martha King's hotrod Dassault Falcon 10, and watched the careful Kings spend five minutes of preflight time

calculating V_R . Aboard the CJ1, a computer on the center console does all the work, calculating V_R to the knot, based on density altitude and weight aboard. On this Wichita morning, the computer spat out a V_R of 108 knots with takeoff flaps.

The easy part is keeping the CJ1 aligned on the centerline. The hard part is pinching your bladder during those last 40 knots over the ground, which is *f-a-s-t*. I can hear a few Learjet jockeys snickering—Lears typically rotate at 130 to 140 knots—but any pilot of a light single would agree. I

Cessna Citation CJ3 (Model 525B)

Average equipped price: \$6.065 million

Specifications

Powerplants.....Two Williams International
FJ44-3A, 2,780 lbt ea.
Recommended TBO4,000 hr
Length50 ft 2 in
Height15 ft 2 in
Wingspan52 ft 11 in
Wing area294.1 sq ft
Wing loading47.16 lb/sq ft
Power loading2.49 lb/hp
Seats2 + 6/8
Cabin length, excluding cockpit15 ft 8 in
Cabin width4 ft 9 in
Cabin height4 ft 9 in
Standard empty weight8,090 lb
Basic operating weight (2 pilots)8,590 lb
Max ramp weight14,070 lb
Max takeoff weight13,870 lb
Max zero fuel weight10,510 lb
Max useful load5,910 lb
Payload w/full fuel770 lb
Max landing weight12,750 lb
Fuel capacity706 gal (4,710 lb)
Baggage capacity, aft1,100 lb, 74 cu ft

Performance

Balanced field length, SL @ 15 deg C/
59 deg F3,450 ft

Balanced field length, 5,000 ft @ 25 deg C/
77 deg F5,200 ft
Rate of climb, sea level4,350 fpm
Single-engine ROC, sea level1,020 fpm
Climb performance at MGTOW
.....37,000 ft in 16 min
.....41,000 ft in 21 min
.....45,000 ft in 35 min
Max cruise speed/fuel burn
(ISA and mid-cruise weight)
.....417 KTAS/1,308 pph @33,000 ft
.....387 KTAS/734 pph @45,000 ft
Range (+/- 4%) w/2 pilots, 4 pax and full
fuel1,771 nm
Landing distance (SL, ISA, Max landing
weight)3,070 ft
Maximum operating altitude45,000 ft
Pressurization differential8.9 psi
Sea level cabin to23,586 ft
Cabin altitude @45,000 ft8,000 ft

Limiting and Recommended Airspeeds

V_R (rotation)102 KIAS
 V_1 (takeoff decision speed)105 KIAS

V_2 (takeoff safety speed)114 KIAS
 V_{FE} (max flap extended), 35 deg160 KIAS
15 deg200 KIAS
 V_{LE} (max gear extended)250 KIAS
 V_{LO} (max gear operating)
Extend250 KIAS
Retract200 KIAS
 V_{ref} (reference speed, final approach)
.....107 KIAS
 V_{MO} (max operating speed), SL to 8,000 ft ..
.....260 KIAS
8,000 ft to 29,300 ft275 KIAS
 M_{mo} (max Mach number)0.72 M
 V_{so} (stall speed in landing configuration)
.....86 KIAS

For more information, contact Citation
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telephone 800/4-CESSNA (423-7762) in
the U.S./ 316/517-6056 outside the U.S.;
Fax 316/517-6640; www.CJ3.Cessna.com

All specifications are based on
manufacturer's preliminary calculations,
and are subject to change.

thought, and still think, the 80-knot rotation speed of a Lancair 300 is fast. The CJ1 is almost 30 knots faster and feels like an E-ticket ride.

Then you pitch up to 10 degrees, a steep sight picture for a piston pilot. My instincts wanted to pitch up only 5 degrees, so Reimer kept nudging it up. After that, the CJ1 hand-flies like a dream. We climbed at 2,500 fpm and 140 knots. Flight controls are surprisingly light, Bonanza-like. I have a few minutes of stick time in the right seats of a Pilatus PC-12 and a King Air 200. Those airplanes are ponderous to hand-fly. I expected the CJ1 to be the same. Not at all.

During the Wichita-to-Grand Junction leg, I hand-flew the CJ1 to FL180 before letting Reimer and the autopilot take over.

Flying the CJ1 past Pikes Peak and over Colorado's Monarch range on a morning with 200-mile visibility made me realize that the only thing wrong with my life is that I always seem to be a zero short. If only the CJ1 cost \$400,000 instead of \$4 million. If only the Mustang would debut at \$240,000 instead of two point four. But then, how many people get to fly a jet at all?

We flew over the airport at Grand Junction, Colorado, so that we could turn around and land on Runway 11 against the wind. On final approach I lined up the CJ1 and kept my eyes flicking between the runway centerline and the ship's airspeed. The computer spit out a V_{REF} speed of 104 knots. Three miles out I told Reimer to take over. "No, you're landing this airplane," he said.

What now? Instinct and memories of 80 hours in a Beechcraft A36 Bonanza took over, the sight picture and handling being similar. But the speeds, my gosh, we were hurtling toward Earth at 104 knots! Over the threshold, 100 feet off the ground, and we're still going 104 knots! I felt we were going to plow the nose into the runway. I kept trying to flare, and Reimer in the right seat kept pushing the nose down. Actually, Reimer was flaring, but at a very subtle 1 to 2 degrees up. Just when I figured we were going to bore a hole in the tarmac, the CJ1's trailing link caught. I said a prayer of thanks while remembering to steer with my feet as we decelerated.

The next leg was to San Francisco. With a density altitude of more than 7,000 feet, and Reimer recommending a zero-flap takeoff, the computer told us to rotate at a faster 112 knots. Another E-ticket ride down the runway and precisely at V_R I pitched up to 10 degrees. After the first takeoff from Wichita I had kept my eyes nervously glued to the flight director. But this time I decided to enjoy the flight. I looked mostly outside, and it was a lot more fun. Two thousand feet off the ground I rolled the CJ1 into a gentle climbing 180-degree turn and we headed west. At FL180 Reimer took over and my day as jet PIC was done.

Flying the CJ1 is like that stunningly beautiful heiress you dated one time, before she came to her senses. The rest of your life you wonder: Will it ever be this good again?

Rich Karlgaard is the publisher of *Forbes* magazine. His new book, *Life 2.0: How People Across America Are Transforming Their Lives by Finding the Where of Their Happiness*, has been on *The Wall Street Journal's* business bestseller list.