



Cessna Citation Encore+

Second wind for the last of the legacy Citations

By Fred George

Take a close look at Encore+ and you would be hard-pressed to guess that it's a third-generation derivative of the nearly two-decade-old Citation V. Cessna Aircraft, the undisputed master of iteration, has modified the wing, narrowed the track of the main landing gear and incorporated trailing link suspension, along with increasing range/payload flexibility, improving the cabin environment, reducing the airport noise footprint and cutting operating costs during that time period. Some of the block-point production changes almost make the iterations look like new models.

The latest version of the venerable CE-560 gets the two most important ingredients in Cessna's "sure thing" formula for evolutionary success: enhanced engines and considerably more capable avionics. The formula for Encore+ also includes some

useful cabin upgrades and several standard equipment items that were extra cost options on the 2000 to 2006 Encore. Newer technology avionics, among other changes, wrings 140 pounds of weight out of an Encore+ equipped the same as an Encore. In addition, MTOW has been bumped up by 200 pounds to 16,830 pounds, thus the net payload of Encore+ goes up by 340 pounds.

Average equipped Encore+ aircraft now have a tanks-full payload of 1,170 pounds, a significant improvement over the Encore. While this doesn't give Encore+ the tanks-full, seats-full capabilities of class-leaders Learjets 40XR and 45XR, it does move Encore+ into the tanks-full payload league of Cessna's top-of-the-line Sovereign and Citation X business jets.

Encore+ and Encore are virtually identical outside, but there are major changes in the cockpit, as described in the Pro Line 21 avionics and PW535B turboprop sidebars accompanying this report. The Honeywell Primus 1000 equipment aboard Encore was state-of-the-art a decade ago, but today's large-format, flat-panel displays, fed by more

powerful computers, offer four-way situational awareness improvements — navigation, weather, traffic and terrain. Adding FADECs to the Pratt & Whitney Canada turboprops endows this aircraft with set-and-forget thrust management, significantly reducing pilot workload.

What Cessna didn't change aboard Encore+ is perhaps as important as its upgrades. The aircraft still has the best cockpit visibility of any model in the light jet class. Its systems are simple, rugged and reliable, most of them dating back to the mid-1980s or earlier. The configuration-compensated angle-of-attack gauge has been retained, in prominent view just left of the pilot's PFD. The angle-of-attack indexer lights have been retained on top of the glareshield. Encore+ still offers virtually unmatched airport performance, with the exception of the lighter, smaller and sprightlier Citation CJ3.

Like all Model 560 aircraft, the main cabin of Encore+ offers plenty of space for five passengers and can accommodate as many as eight for short trips. Unlike previous models,

Photography courtesy of Cessna/Dan Moore

though, operators can fill the tanks and fly five passengers, with plenty of surplus payload capacity for extra baggage. The five passenger range is more than 1,670 nm. Extra passengers each cost about 80 nm of range, thus if needed Encore+ can fly coast-to-coast with one stop in either direction in the U.S. with all seven main cabin seats occupied.

Passenger Accommodations and Cabin Refinements

Encore+'s standard seven-passenger seating configuration includes a single, rear-facing forward chair on the right side of the cabin across from the main entry door, a center four-chair club section just aft of the cabin door and two forward-facing single chairs in the aft cabin. A belted potty seat, certified for full-time occupancy, increases total seating capacity to eight passengers.

Double-club seating for eight passengers is optional. Where all these people might store their luggage for long trips is a challenge. Encore+ has 29.6 cubic foot of external baggage volume in the tail cone compartment. A 6.9-foot (210 cm) ski tube, though, now is a standard feature of the aft baggage compartment.

Inside the cabin, the forward right coat closet, just behind the copilot's seat and the forward-most passenger seat, holds 2.4 cubic feet of gear. The aft internal storage area, across from the potty seat in the lavatory, holds another 26 cubic feet of carry-on luggage.

Passengers enter the aircraft up a sturdy, two-section folding ladder and through the traditional 12-pin, vault-design, tapered-width passenger door used in legacy Citations. The door has its own full-size window, so each side of the fuselage has seven 11-inch-wide by 15-inch-tall windows, providing lots of ambient light.

A five-inch dropped aisle runs through most of the main cabin seating section, aft of the entry door. This provides 4.8 feet of headroom in the center of the cabin. Cabin width is 4.8 feet, measured atop the side wall railings and the floor is 3.2 feet wide. The main seating area is 14.9 feet long, measured between the cockpit/cabin divider and aft lavatory bulkhead.

High-gloss faux wood finish is standard on the cabinetry. High-gloss wood veneer coverings are optional. The cabinet contours are softer, curvier with hard chamfered edges eliminated.

The side wall ledges and tray tables have rounded bull-nose edges. The galley has 25 percent more hot beverage storage capacity and increased work surface area.

The aft lavatory is 2.3 feet long and the floor is about three inches higher than in the main cabin because the wing carry-through structure intrudes through the fuselage. The



Standard cabin configuration remains center club, with two forward-facing single seats in the aft cabin and a right forward aft-facing seat (not shown). The overhead panel now features long-life LED wash lighting, and sidewall ledges have been fitted with a soft leather bull-nose cap.



The left forward galley has been redesigned with softer contours. There is more storage capacity, and incandescent lights have been replaced with long-life low-heat LEDs. Just behind the copilot seat, there is a coat closet with a good sized compartment at the bottom to hold navigation publications or an EFB.

measurements make for tight maneuvering for large folks.

There is no wash basin in the lavatory. Plan on using sanitary moist wipes.

But Encore+ isn't designed to be a long-distance luxu-cruiser. It's a light jet workhorse that's intended to offer a faster, higher flying, more productive alternative to eight- to nine-passenger turboprops, such as the Beech King Air 200 and 350. While Encore+ burns about 30 percent more fuel than a typical business turboprop, it also slashes 1,000 nm trip times by an hour.

Structure and Systems

All Cessna Citations use high-strength aluminum alloys, among other metals, for the primary airframe structure. Extensive adhesive metal bonding is used during manufacturing, reducing the number of

mechanical fasteners required and the associated labor content.

The circular fuselage provides a constant cabin cross section from just aft of the cockpit to the aft pressure bulkhead. The entry door on the left side of the aircraft is carried over from the original 1971 Citation 500. Newer Citations have plug-design doors that meet later certification requirements. A plug-design emergency exit is located directly across from the main entry door on the right side of the fuselage.

All transparencies are formed from stretched acrylic, including the windshields. While strong, such plastics are prone to scratching and crazing over time. Newer Citations have glass-surfaced windshields that are more durable.

Model 560 aircraft have two-spar, torque box wing structures. The spar carry-through

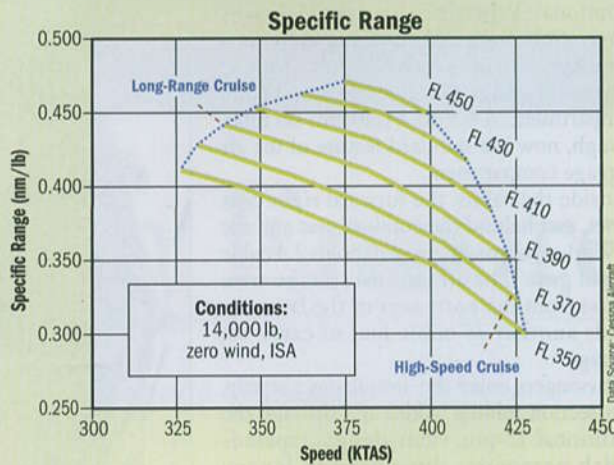
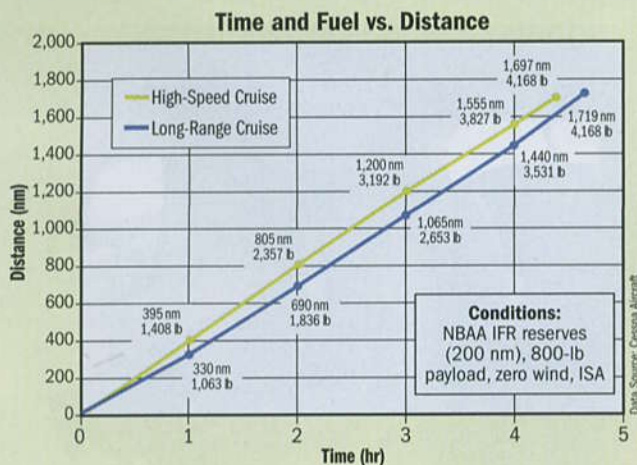
Citation Encore+

These graphs are designed to illustrate the performance of the Encore+ under a variety of range, payload, speed and density altitude conditions. Do not use these data for flight planning purposes because they are gross approximations of actual aircraft performance.

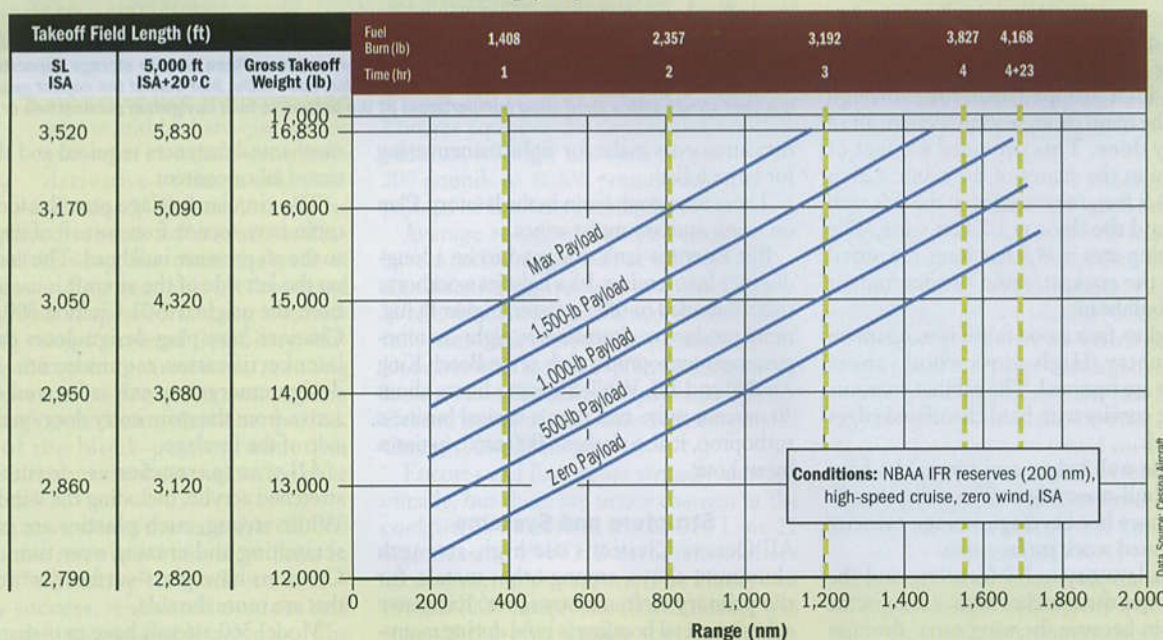
Time and Fuel vs. Distance — This graph shows the relationship between distance flown, block time and fuel consumption. At long-range cruise, the Encore+ flies less than 2 percent farther than it does at high-speed cruise. Most operators, as a result, are likely to cruise at 0.67 to 0.72 Mach high-speed cruise on all but the longest range missions. Cessna's 10,460-pound estimated BOW is representative of a well-equipped aircraft with eight passenger chairs. Factory standard options are few and relatively lightweight, thus equipping the aircraft with most extra-cost equipment has comparatively little impact on the aircraft's tanks full payload.

Specific Range (Mid-Range Weight, ISA) — This graph shows the relationship between cruise speed and fuel consumption for the Encore+ at representative cruise altitudes for 14,000-pound, mid-weight aircraft. We did not have the opportunity to verify these data during our evaluation flight. The Encore+ has virtually identical cruise performance as its predecessor Encore 604 because both aircraft share the same wing and the performance of the PW535B engines is the same as that of the PW535 turboprops.

Range/Payload Profile — The purpose of this graph is to provide simulations of various trips under a variety of payload and two airport density altitude conditions, with the goal of flying the longest distance at high-speed cruise. Each of the five payload/range lines was plotted from multiple data points provided by Dave Champley's team of Cessna Citation performance engineers, ending at the maximum range for each payload condition. The time and fuel burn dashed lines are based on the high-speed cruise numbers shown in the Time and Fuel vs. Distance graph. Runway distances for sea-level standard day and for B&CA's 5,000-foot elevation, ISA+20°C airport accompany the takeoff weights, using the 15 degrees takeoff/approach flap configuration. Using flaps 15 degrees, operators actually can depart a 5,000-foot elevation airport at MTOW at up to 104°F. If you have an 8,790-foot-long runway, the aircraft at MTOW can take off from the same airport at up to 108°F.



Range/Payload Profile





The aft lavatory, fully enclosed by a pair of solid pocket doors, has an internally serviced flush toilet. There is no wash basin, so plan on using moist sanitary wipes for post potty chore clean-up. The left side of the lavatory has an additional carry-on luggage compartment.

structure intrudes into the aft cabin, so the floor is higher and available head room is reduced. The basic airfoil is a 1930's vintage NACA 23000 design used on all legacy Citations. However, for Model 552 and 560-series airplanes, Cessna aerodynamicists modified the leading edge contours to raise the critical Mach number and increase efficient cruising speed by as much as 46 knots. The Encore and Encore+ also have longer wing spans than the original Model 560 for better high altitude performance and leading edge boundary layer energizers and partial stall fences that improve handling characteristics at maximum lift coefficients. This is an important change from the original 23000-series airfoil that was known for its pronounced wing roll-off at the stall.

All fuel is carried in wet wing fuel tanks that, combined, have an 806-gallon (5,400 pounds) usable capacity. Single-point pressure refueling (SPPR) is standard, but the aircraft also may be refueled through over-wing ports. SPPR refueling time is less than six minutes.

Fuel/oil heat exchangers eliminate the need for anti-icing fuel additives. The fuel supply architecture is carried over from the earliest Citations. It's simple and it works almost flawlessly.

Electrical power is supplied by a single 44 amp/hour nicad battery in the tail cone. A lead-acid battery, having slightly lower cranking capacity and 5.9 pounds more weight, is available as a no-cost option. Two 300-amp DC starter/generators supply power to the parallel buss electrical system. Either generator can handle virtually all electrical loads, except for the motor-driven air-conditioner. Encore+ has redundant battery disconnect relays, providing disconnect protection in case of a stuck relay. If a main battery-disconnect relay sticks closed, a red-guarded switch in the cockpit allows the secondary-disconnect relays to be opened.



Each of the seats in the cabin adjusts in pitch, tilt, lateral track and yaw. The cabin now has standard AC power outlets for office equipment next to the left and right forward-facing seats in the center club section.

All pilot-accessible circuit breakers are mounted on left and right side panels in the cockpit, in ready reach above the arm rests. All systems are DC powered, but there is a 500 Watt solid-state inverter that supplies AC power to one utility outlet in the cockpit and two in the cabin.

Aboard the Encore+, an on-demand, open-



Trailing link main landing gear made its debut on the Encore. It works just as well on the Encore+ in providing consistently smooth touchdowns.

center hydraulic system, powered by engine-driven pumps provides the motive force to operate the landing gear, wing flaps, speed brakes and thrust reversers. When power is needed to operate these components, a bypass valve closes in the system, causing pressure to increase to 1,500 psi just long enough to complete the actuation function. After

Citation Encore+

B&CA Equipped Price: \$8,105,000

Characteristics

Seating	. . . . . 2+8
Wing Loading	. . . . . 52.2
Power Loading	. . . . . 2.48
Noise (Takeoff) (EPNdB)	. . . . . 71.5

Dimensions (ft./m)

Internal	
Length	. . . . . 17.3/5.3
Height	. . . . . 4.8/1.5
Width (Maximum)	. . . . . 4.8/1.5

Power

Engine	. . . . . 2 PWC PW535B
Thrust (lb ea.)	. . . . . 3,400
Fleet Rating	. . . . . ISA+12°C
Inspection Interval (hr.)	. . . . . 5,000

Weights (lb/kg)

Max Ramp	. . . . . 17,030/7,725
Max Takeoff	. . . . . 16,830/7,634
Max Landing	. . . . . 15,200/6,895
Zero Fuel	. . . . . 12,600c/5,715c
BOW	. . . . . 10,460/4,745
Max Payload	. . . . . 2,140/971
Useful Load	. . . . . 6,570/2,980

Executive Payload	. . . . . 1,600/726
Max Fuel	. . . . . 5,400/2,449
Payload With Max Fuel	. . . . . 1,170/531
Fuel With Max Payload	. . . . . 4,430/2,009
Fuel With Exec. Payload	. . . . . 4,970/2,254

Limits

Mmo	. . . . . 0.755
Trans. Alt. FL/Vmo FL	. . . . . 289/292
PSI	. . . . . 8.9

Climb

Time to FL 370	. . . . . 13 min.
FAR Part 25	
OEI Rate (fpm/mpm)	. . . . . 908/277
FAR Part 25	
OEI Gradient (ft./nm, m/km)	. . . 474/78

Ceilings (ft./m)

Certificated	. . . . . 45,000/13,716
All-Engine Service	. . . . . 45,000/13,716
OEI Service	. . . . . 30,350/9,251
Sea Level Cabin	. . . . . 23,586/7,189

Certification

FAR Part 25, 1988/94/2000/06

hydraulic power is no longer needed, the bypass valve opens, thereby allowing pressure to decrease to about 60 psi. This greatly reduces stress on the system and minimizes the development of leaks. The accumulator reservoir for the engine-driven hydraulic system is in the tail cone. A second, electrically-powered hydraulic system, mounted in the nose compartment, provides pressure for the anti-skid power brakes. Both systems use synthetic phosphate ester hydraulic fluid.

All primary flight controls are mechanically actuated. The aircraft has three-axis manual trim and electric pitch trim. An electronic yaw damper increases ride comfort, but there are no flight envelope limitations if it's inoperative.

The four-panel, trailing edge flaps are hydraulically actuated through four positions.

Like all legacy Citations, Encore+ has mechanically actuated trim and flap position indicators.

Upper and lower hydraulically actuated speed brakes are located on each wing. There are no flight or configuration limitations on use of speed brakes. They retract automatically when either engine throttle is advanced past the 85° N2 turbine rpm position.

Engine bleed air is used for cabin pressurization. An 8.9 psid pressurization, regulated by a solid-state digital controller in the cockpit, provides a 7,500-foot cabin altitude at the aircraft's 45,000-foot maximum cruise altitude. Sea level cabin pressure can be maintained to greater than 23,000-foot cruise altitude. A bleed-air powered air cycle machine and an electrically-powered vapor-cycle air-conditioner

provide refrigeration. Bleed air also is used for cabin heating, emergency pressurization, wing leading edge anti-ice protection and windshield rain removal/deicing and defogging. A pressurized alcohol spray system provides back-up deice protection for the pilot's windshield. Air data and angle-of-attack sensors are electrically heated for anti-ice protection.

Exterior lighting is conventional, with single incandescent bulbs used for navigation position, landing gear-mounted taxi and wing leading-edge mounted landing/recognition lights. Conventional strobe lights, anti-collision beacons, ice detection and logo lights complete the package. A Precise Flight Pulselite system is standard, including an automatic activation feature triggered by a TCAS resolution advisory.

Rockwell Collins Pro Line 21

The instrument panel of Encore+ is far different from any previous Model 560. Encore+ marks the first time Rockwell Collins avionics have been installed in a legacy narrow-body Citation, following the move from Honeywell to Rockwell Collins equipment started by the CJ-series.

The Pro Line 21 system aboard Encore+ is quite capable and it includes new single-channel digital autopilot with dual-channel flight guidance system, Pro Line 21 CNS radios and 3D navigation FMS-3000. The package includes three, eight-by-ten inch portrait configuration active matrix LCD screens, featuring edge-to-edge attitude indicators on the PFDs and integrated engine instruments on the MFD. The stand-alone engine instrument package used in the Encore has been eliminated, allowing the standby instruments to be moved above the MFD. The MFD, as a result, is moved left, much closer to the pilot's PFD for better viewing. Dual radio tuning units, plus a panel-mount GPS, are right of the MFD.

The heart of the system is the IFIS-5000 with integral FMS card, file server and digital flight guidance functions. This is the box that makes possible Collins chart-link Jeppesen e-charts, enhanced map graphics and XM radio or Universal weather integration. Data is updated by means of a data port on the aft side of the center console.

The Pro Line 21 package is quite complete, including a solid-state 24-watt weather radar, dual solid-state attitude/heading references systems, dual digital air data computers, dual Pro Line 21 radios including a three-channel DME, TCAS II, electronic checklist feature, single 12-channel GPS receiver, maintenance diagnostic computer and single radio altimeter. Honeywell supplies the Mark VIII Enhanced GPWS and L3 provides the integrated standby instrument system and CVR. The kit includes a three-frequency Artex ELT with position broadcast function, a standard Heads Up Technology XM radio weather receiver and panel-mount Garmin GPS 500 certified for both domestic U.S. and North Atlantic MNPS airspace. The Garmin box is WAAS capable, but Collins won't have WAAS certification for its GPS sensor until early 2008. A software upgrade and new antenna will be required.

But this Pro Line 21 system has been grafted onto the existing



airframe and adapted to legacy systems rather than being a clean-sheet design, so it shares shortcomings with a Pro Line 21 Continuum retrofit installation. There is no Crew Alerting System built into the MFD, so the triple row of annunciators remains stuffed into the glareshield. The digital flight guidance system controls, as a result, must be mounted in the instrument panel and console, instead of being located in the glareshield. The single file server requires the crew to carry a stand-alone EFB terminal, such as a Fujitsu 3500, to meet the redundancy requirements needed for paperless chart operational approval.

The single Collins FMS-3000 doesn't connect with the Garmin GPS 500, so each box must be programmed independently prior to flight and when the flight plan must be changed. The optional second Collins FMS-3000 CDU must be mounted in the instrument panel, rather than in the console because digital flight guidance controls and other controls occupy space in the console.

Other options include a Doppler turbulence detection weather radar (\$26,825 and two pounds), Air Cell ST-3100 Iridium SATCOM phone (\$40,150 and 5.2 pounds), the aforementioned second FMS-3000 with second 12-channel GPS receiver (\$55,500 and 6.2 pounds), HF radio with SELCAL (\$70,625 and 38.5 pounds), ADF receiver (\$16,500 and 7.5 pounds), JAR OPS-1 compatible LE3 Flight Data Recorder (\$85,575 and 34.4 pounds) and request/receive, pay-per-play Universal weather capability (\$51,375 and 6.5 pounds), among other equipment.

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Flying Encore+

We belted into the left seat of s.n. 560-0753 for a demonstration flight, accompanied by senior demonstration pilot Mike Walton and safety pilot Alex Unruh. The aircraft's BOW was 10,499 pounds, 39 pounds heavier than Cessna's estimate for a typically equipped aircraft because of a few extra options, such as an Air Cell SATCOM phone. With three passengers aboard and 5,000 pounds of fuel, the ramp weight was 16,100 pounds and the computed takeoff weight was 16,000 pounds.

Wichita's field elevation is 1,330 feet, the outside air temperature was 83°F and the barometer setting was 29.48-inch Hg, resulting in a density altitude of 3,561 feet. The computed no-wind takeoff distance was 3,835 feet, however the wind was 210 at 21 with gusts to 28 thereby reducing the TOFL. The computed V speeds were 95 KIAS for V₁, 102 KIAS for rotation, 113 KIAS for one-engine-inoperative takeoff safety speed and 160 KIAS for single-engine en route climb speed. Cessna plans to incorporate a tabular performance look-up function with automatic V-speed posting on the PFD, but that feature won't be available until 2008.

Walton had the aircraft plugged into ground power so that he could talk us through initialization and programming of the FMS-3000. Using the CDU's scratch pad feature, we filled in the blanks. Unruh pointed out that an IDX, or index, key calls up a table of contents that provides one-touch access to all operational chapters.

Having previously run through the pre-flight checks and tests, Walton signaled for engine start. We disconnected the external power, having no one to pull the plug after we shut the cabin door. A touch of the right engine start button engaged the starter-generator. At ten percent N₂ turbine rpm, we were tempted to advance the throttle to the idle position, but we delayed until we noted positive N₁ fan rotation. When that occurred, we move the throttle forward and the FADEC handled the rest of the start chores, including disengaging the starter. After that, the generator automatically came on the line.

We repeated the process for starting the left engine and called ground for taxi. Rolling out of the chocks, we noted that the brakes were a little touchy when cold. Cessna's bungee link nosewheel steering system provides ample steering authority for all but the tightest maneuvering. Differential thrust and brakes can be used to pivot the aircraft around in close quarters.

Once cleared for takeoff on Runway 19L, we flicked on the strobe lights, pitot heat and landing lights. The FADECs automatically turn on the ignitors when the thrust is advanced for takeoff and a squat switch activates the selected TDR-94S Mode S diversity transponder.



Bleed-air heating is used for wing anti-ice protection. Leading-edge boundary layer energizers, plus stall fences, minimize roll-off at the stall break.

We advanced the throttles through the max cruise and max climb detents to the forward stops. The engines accelerated quickly and stabilized at the 86.2-percent target fan speed, precisely what was needed to achieve the published takeoff field length. Quite candidly, we would have been hard pressed to set 86 percent on the roll, let alone 86.2-percent fan rpm. That's graphic testimony to the efficacy of FADECs.

We crosschecked airspeed indications at 80 KIAS and pressed on to V₁. At 102 KIAS, we started the rotation. The trailing link main landing gear are well aft of the center of gravity, so it took a strong pull on the control yoke to rotate the aircraft for takeoff, thereby prolonging our ground roll.

Once airborne, we retracted the gear and flaps, accelerated to 250 KIAS above the Class

D airspace, pulled the throttles back to the climb detent and headed west for some basic airwork at FL 230. Steep turns are easy in the aircraft because its control forces in flight are moderate and predictable, plus the edge-to-edge attitude indicator on the PFD makes it easy to see small changes in pitch and roll attitude.

We flew a couple of approaches to stalls in the clean and landing configurations. Stall buffet is preceded by a tactile warning provided by the stall warning stick shaker. These maneuvers are all the more comfortable because of the prominent position of the angle-of-attack indicator, AoA repeater on the airspeed scale of the PFD and AoA indexer lights atop the glareshield.

The stall buffet was accompanied by a slight left wing roll off, easily countered by

Pratt & Whitney Canada PW535B Turbopans

The latest iteration of the now well proven 3,400 lbf PW535, flat-rated to ISA+12°C, has been fitted with a FADEC that greatly reduces pilot workload. There are three detents in the throttle quadrant — full forward for takeoff thrust, one notch back for maximum continuous/climb and a second notch farther aft for maximum cruise thrust. The result is simple, set-and-forget thrust setting for the most critical phases of flight.

This results in very consistent runway performance and more time looking out of the cockpit during climb and cruise.



Mechanical features include a wide-chord, integrally bladed rotor (IBR) fan and an IBR core booster stage powered by a three-stage low-pressure turbine. Bypass ratio is a modest 2.55:1, helping to minimize thrust lapse rate with density altitude increase. The core features dual axial flow compressors and a single centrifugal compressor stage. PWC's trademark reverse flow combustor section comes next, followed a single-stage,

high-load, high-pressure turbine stage that powers the core. Hot core and cold bypass flows are combined by a deep-fluted mixer nozzle that both reduces noise and improves high-altitude cruise thrust performance.

Hot section inspection intervals are at 2,500 hours and overhauls are scheduled for 5,000 hours — impressively long for this class of turboprop.



Short-field performance remains a strong suit of the Encore+. The aircraft has a 3,520-foot TOFL at MTOW and it needs less than 3,100 feet of runway for a 1,000-nm trip, assuming sea-level, standard-day conditions.

aileron input and relaxation of control yoke back pressure. While not as docile as the stall in a CJ-series aircraft, Encore+ exhibited approach-to-stall behavior that's well within FAR Part 25 certification limits.

Having flown Encore through a full B&CA flight test profile in 2001, we were confident that Encore+ would provide no surprises. So, we elected to return to Wichita to focus on the capabilities of the new Pro Line 21 avionics suite.

Walton called up the ILS Runway 19L approach from the FMS data base. This programmed the ILS localizer frequency into the nav radio field of the radio tuning units. The Jeppesen approach chart appeared on the MFD screen, along with a small magenta airplane symbol that indicated our relative position. Wichita Approach Control then switched our runway assignment to Runway 19R. A few button pushes and Walton had that approach plate up on the MFD in anticipation of our crew briefing.

We engaged the autopilot so that we could both focus on the chart image for the crew briefing. The large chart image on the MFD provides an excellent reference for both crewmembers to see. We ran across the top line, reviewed all pertinent data and discussed the missed approach procedure. We also made a note that the autopilot is considerably smoother and more precise than the Primus 1000 unit in the Ultra and Encore.

Based on a computed landing weight of 15,200 pounds and a flaps 35° configuration, we bugged the VREF landing speed at 108 KIAS for the aircraft's maximum landing weight of 15,200 pounds. Once established on the final course inbound, we extended flaps to 15° at 160 KIAS, noting some ballooning due to the extra lift provided by the four large flap panels. We also watched the progress of the aircraft symbol on the ILS Runway 19R approach chart graphic on the MFD. The moving map display on the e-chart makes it almost impossible to get lost

or lose position awareness.

Extending gear one dot below glideslope intercept and full flaps at the outer marker, we experienced a mild nose-down pitching moment with flap movement between 15° and 35°. We stabilized at VREF + 10 to provide extra cushion for the gusting winds.

Throttle response was fairly linear, enabling us to make small adjustments to correct for speed errors. Control forces at slow speeds are low, quite typical of a light with manual controls. But roll response isn't as crisp as in an airplane with powered spoilers, such as Learjet 40XR or 45XR. The upside of manual controls, though, is no need to maintain full-time hydraulic system and powered flight control actuators.

We pulled the throttles to idle at 50 feet AGL and slowly decelerated to landing speed. Again we noted that a healthy amount of back pressure on the control yoke is needed when the main wheels touchdown to prevent the nosewheel from hitting onto the pavement too firmly.

Walton retracted the flaps to 15°, readjusted the pitch trim and called "Go!" We accelerated to 100 KIAS, rotated and continued on departure in preparation for the second approach.

This time we requested the RNAV (GPS) Runway 19R approach to sample the 3D navigation capabilities of the FMS-3000. We proceeded directly to CADAC intersection, an initial approach fix on one of the base legs to final. FMS-3000 turned this non-precision approach into a 3D procedure, which would have enabled us to fly hands off to minimums, if we had so chosen. For all practical purposes, the precision navigation provided by the FMS made this procedure into an ILS look-alike.

At touchdown, we executed a touch-and-go. Once the landing gear had retracted, Walton retarded the right engine throttle to idle to simulate an engine failure. Rudder pedal forces, even though the aircraft doesn't

have a rudder boost or bias system, were moderate, nicely manageable for pilots with low to average strength, in B&CA's opinion.

We continued with the simulated engine failure, flying the aircraft in the right VFR traffic pattern for Runway 19R. We extended the landing gear and held the flaps at 15° on final until landing was assured. At that point, we extended full flaps and slowed the aircraft to VREF for landing.

Our last landing was a no-flap maneuver. We added 15 knots to the published VREF speed to compensate for the lower lift of that configuration. The landing gear provide ample drag to help control airspeed during the descent to the runway. At 50 feet, we retarded the throttles to idle and noted there was little deceleration. There also was less tendency for the nose to rotate down when the mains touched down.

We extended the speed brakes and deployed the thrust reversers, using two-thirds of the 10,300-foot runway to slow to 60 KIAS before easing into the brakes. Exiting the runway, we taxied back to Cessna's customer delivery center ramp logging 59 minutes in flight.

Our overall impression of the aircraft is that it's another in a long line of legacy Citations that's docile handling in the pattern. The trailing link landing gear flatters pilots with consistently smooth touchdowns, all the more obvious when surface winds are gusting and conditions aren't optimum for perfect landing technique.

The new Pro Line 21 avionics suite, with XM radio weather, electronic Jeppesen charts and enhanced map graphics, including SUA boundaries, geopolitical borders and rivers, greatly improves situational awareness. It's great that business jet manufacturers are embracing the moving map features that long have been staples in high-end general aviation piston-singles.

The engine FADECs make the aircraft considerably easier and safer to fly because neither pilot has to spend time head-down in the cockpit fine-tuning thrust settings, so there's more time to look outside and watch for traffic. This is all the more apparent when flying multiple approaches.

Price and Value

Encore+ is a highly competitive light jet, as shown by the accompanying Comparison Profile chart. The aircraft's strong suit continues to be short field performance, a key asset for day-to-day short haul briefcase missions.

Its most apparent shortcoming is tanks-full payload, but the bar on the graph is a little misleading. Encore+ can fly five people 1,675 miles, six people more than 1,600 miles and eight folks almost 1,450 miles. Few groups of six to eight passengers will want to fly any more than three and one-half to four hours

together in a light jet. So, the shortcoming in tanks-full payload may be an artificial constraint.

Encore+ has far-and-above the best climb performance in the light jet class, an asset that's not shown on the Comparison Profile. It can climb to FL 370 in 13 minutes and reach FL 450, its maximum cruise altitude, in 27 minutes. Sprightly climb performance enables Encore+ to accelerate to high speed, thereby reducing mission block times. Thus Encore+ is more competitive with faster aircraft in class on short-range missions than its top cruise speed might suggest.

Its PW535B engines offer excellent fuel efficiency, but the modified high-lift wing fitted to Encore+ doesn't offer the high-speed, low-drag characteristics of newer

airfoils, such as those used by the CJ-series and next-gen Learjets. Top cruise speed and specific range, as a result, fall below the composite average of competitive light jets, as shown by the Comparison Profile.

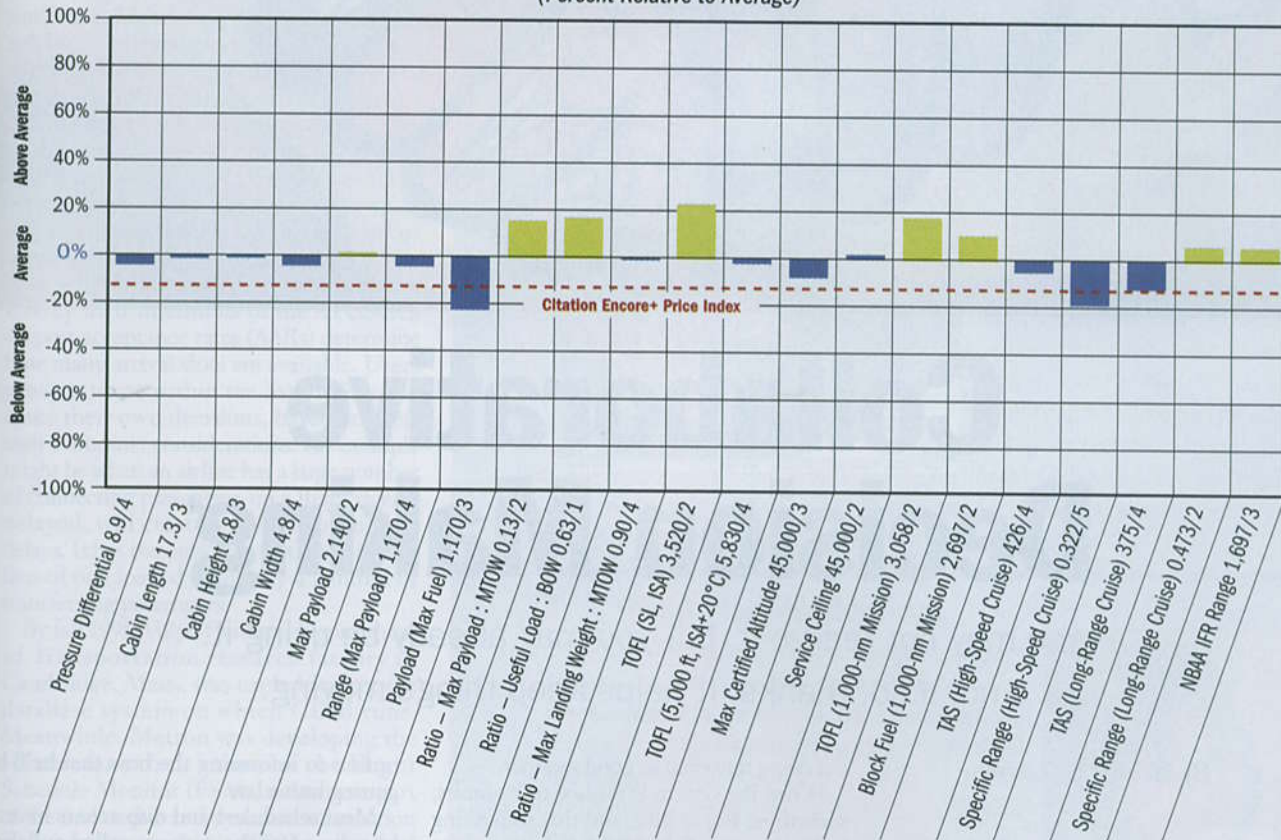
Encore+ has a 12 percent price advantage compared to the composite average. This erases most of the apparent shortcomings. Price versus performance perhaps is a more telling measure of value. Encore+ has a clear advantage over the competition when price is used as the base line for comparison. In addition, Encore+ has the legacy of Cessna's virtually unmatched light jet product support. This factor alone will sway many buyers who are comparing various new light jet models.

Cessna officials declined to discuss the

order book for Encore+, but they did disclose that 24 units will be built in 2007. However, many newcomers and improved versions of other aircraft are catching up. The arrival of CJ4 is scheduled for 2010. It will offer the same cabin length as Encore+, slightly higher cruise speeds, improved fuel efficiency and even better airport performance. Its clean-sheet cockpit will feature four Pro Line 21 displays, dual FMS, full EICAS and a proper glareshield-mounted digital flight guidance system control panel.

The backlog for CJ4, though, is long and the next available delivery is years away. And that's a key advantage for Encore+. This thoroughly updated legacy Citation will remain a value leader in the light jet class for years to come. **B&CA**

Comparison Profile
(Percent Relative to Average)



Designers attempt to give exceptional capabilities in all areas, including price, but the laws of physics, thermodynamics and aerodynamics do not allow one aircraft to do all missions with equal efficiency. Trade-offs are a reality of aircraft design.

In order to obtain a feeling for the strengths and compromises of a particular aircraft, B&CA compares the subject aircraft's specifications and performance attributes to the composite characteristics of other aircraft in its class. We average parameters of interest for the aircraft that are most likely to be considered as competitive with the subject of our report, and then we compute the percentage differences between the parameters of the subject aircraft and the composite numbers for the competitive group as a whole. Those differences are presented in bar graph form along with the absolute value of the specific parameter for the subject aircraft and its ranking relative to others in the composite group.

For the Encore+ Comparison Profile, we compared the aircraft to a composite group of aircraft including the Citation CJ3, Hawker 400XP, Bombardier Learjet 40XR and Learjet 45XR. The four competitors were closest in price and performance to the Encore+. Please note that the Comparison Profile is meant to illustrate the relative strengths and compromises of the subject aircraft, rather than being a means of comparing specific aircraft models to each other.