



Cessna Citation Sovereign

The largest Citation yet built offers good range and light jet airport performance.

By Fred George

Photography by Paul Bowen

For almost three decades, the midsize jet has been one of the most hotly contested segments of the business aircraft market. No one has been more keenly aware of this than the folks at Cessna. They threw their hats into the ring in 1978 with the Citation III and followed up with the Citations VI, VII, X and Excel, each with its own balance of speed, comfort, runway performance, range and price.

The Citation Sovereign, slated for certification late this year and early 2004 customer deliveries, is the firm's latest and perhaps best-ever midsize aircraft because it performs this balancing act with fewer tradeoffs than traditional midsize aircraft, according to Russ Meyer, Cessna's chairman and CEO.

"Versatility is this aircraft's strong suit," explained Meyer. "Sovereign has respectable speed, 0.74 to 0.75 [Mach] at high

altitude. It has transcontinental range at maximum cruise power and it can routinely operate out of 4,000- to 4,500-foot strips," he said.

Those claims proved true during our early June evaluation flight. At a mid-range weight of 24,000 pounds, the Sovereign cruised comfortably at 0.761 Mach, equivalent to 433 KTAS at ISA-3°C and beating Cessna's published cruise speed by 12 knots. On a standard day, the aircraft needs but 3,694 feet of runway for takeoff, making it second only in takeoff field length performance to Cessna's sprightly Excel with a 3,590-foot TOFL. Departing from *B/CA's* hot-and-high, 5,000-foot elevation, ISA+20°C airport, the Sovereign easily beats all midsize competitors with a 5,310 foot TOFL.

"Its cabin is significantly better than any other midsize airplane and it has a great baggage compartment," Meyer commented. The Sovereign indeed has the largest volume of any Citation yet built and its cabin is nearly 3 feet longer than that of the Raytheon Hawker 800XP, the competitor most frequently mentioned in product comparisons, though the Hawker has a slightly larger

cabin cross section. The Sovereign also features a 100-cubic-foot, external aft baggage compartment.

Meyer excludes the Bombardier Challenger 300 and Raytheon Hawker Horizon in such midsize aircraft comparisons because they're considerably larger than most aircraft in this class and \$4 million to \$4.5 million more expensive. The Sovereign's closest competitor in cabin size is the Hawker 1000, but it's long been out of production.

Design simplicity and dispatch reliability were prime concerns during the Sovereign's development process. Its systems are straightforward, but its 16-degree mildly swept wing leading edge and moderately super-critical airfoil shape enable the Sovereign to cruise as fast as 0.796 Mach, or 454 KTAS at ISA-2°C, based upon our observations. Those numbers beat Cessna's cruise manual predictions by 17 knots. No straight-wing Citation ever did that.

Structure and Systems

The Sovereign represents a return to core "simple Citation" design principles, a retreat from the Citation X's high-tech, 500-plus KTAS cruise speed foray. Most of the primary structure is fabricated from riveted and/or bonded high-strength aluminum alloys, including the primary and secondary control surfaces. Composites are used sparingly, such as in the radome and fuselage-to-wing fairings.

Cessna looked briefly at incorporating a new, larger fuselage cross section during initial feasibility studies. However, top management elected to retain the proven Citation III fuselage barrel to keep devel-



The airstair door has a solid feel and is nicely counterbalanced with springs.



The Sovereign represents a return to core "simple Citation" design principles.

opment costs down. Forward of the cabin door, the Sovereign's nose section essentially is the same as that of the Citation X. Cessna's newest Citation, though, will have clean-sheet FAR Part 25 and JAR 25 type certificates. It won't be grandfathered to a previous TC. For example, the aircraft has a new design, fail-safe cabin door with over-center cam-and-roller latches, speed-activated safety locks and a cockpit monitoring system. The door has a passive, outer pressure seal and an inner, inflated acoustical seal.

Pursuing simultaneous FAR Part 25/JAR 25 certification caused Cessna to look at the more stringent certification requirements within the two groups of rules. In some cases, this was FAR Part 25. In others, such as stability and control requirements, this was JAR 25.

The Sovereign's wing area is large. At 516 square feet, it's not much smaller than considerably heavier super midsize aircraft. It has six generously proportioned Fowler flap panels that extend nearly 70 percent of the span and further increase effective wing area. Combine the Sovereign's relatively low wing loading with its Gulfstream-class thrust-to-weight ratio and the product has predictably strong takeoff and climb performance and a 43,000-foot initial cruise altitude. The downside of the comparatively low wing loading is a bumpier ride in rough air.

All fuel is stored in wet wing tanks, which are filled by means of a single-point pressure refueling receptacle in the fuselage fairing, ahead of the right wing leading edge. Alternatively, over-wing refueling ports may be used. Fuel is normally transferred to the engines by means of jet pumps using motive flow supplied by the

engine-driven fuel pumps. DC-powered boost pumps are used for engine starting, cross-feed and as a backup for the jet pumps.

The main electrical system is a split-bus DC design, supplied by starter-generators, an APU certified for use up to 30,000 feet, an external power source or the aircraft's two 44-amp-hour nickel cadmium batteries. The engines also power small AC generators that supply electrical anti-ice heating for the glass windshields. The air data, total temperature and angle-of-attack sensors use DC electrical heat for anti-ice protection.

Only a few main circuit breakers are located in the cockpit. Most others are located at junction boxes in the tail cone, in keeping with the Joint Aviation



The Sovereign's nose section essentially is the same as that of the Citation X.

Cessna Citation Sovereign Specifications
(All Data Preliminary)

B/CA Equipped Price \$13,523,000

Characteristics

Seating 2+9/12
Wing Loading 58.2
Power Loading 2.64
Noise (EPNdB) NA/NA/NA

Dimensions (ft/m)

External
Length 63.5/19.4
Height 20.3/6.2
Span 63.1/19.2

Internal
Length 24.2/7.4
Height 5.7/1.7
Width (Maximum) 5.5/1.7
Width (Floor) 3.5/1.1

Power

Engines 2 P&WC PW306C
Output (lb ea) 5,686
Flat Rating OAT°C ISA+15°C
TBO (hr) 6,000

Weights (lb/kg)

Max Ramp 30,250/13,721
Max Takeoff 30,000/13,608
Max Landing 27,100/12,292
Zero Fuel 20,300c/9,208c
BOW 17,800/8,074
Max Payload 2,500/1,134
Useful Load 12,450/5,647
Executive Payload 1,800/816
Max Fuel 10,770/4,885
Payload With Max Fuel 1,680/762
Fuel With Max Payload 9,950/4,513
Fuel With Executive Payload 10,650/4,831

Limits

MMO 0.800
FL/Vmo FL 285/305
PSI 9.3

Climb

Time to Climb/Alt. 14 min./FL 370
FAR Part 25 OEI Rate (fpm) NA
FAR Part 25 OEI Gradient (ft/nm) NA

Ceilings (ft/m)

Certificated 47,000/14,326
All-Engine Service 43,000/13,106
Engine-Out Service NA/NA
Sea Level Cabin 25,230/7,690

Certification FAR/JAR 25, 4th Quarter 2003



The Sovereign features a 100-cubic-foot, external aft baggage compartment.

Authorities' (JAA) preference for locating them out of reach of the flight crew.

The Sovereign has a single, close-center, constant pressure, 3,000-psi hydraulic system, powered by engine-driven pumps or a DC-powered aux pump. Hydraulic power is used to actuate the landing gear, wheel brakes, thrust reversers, nosewheel steering and the multifunction spoilers.

All landing gear have dual wheels. The mains use a trailing link design for smooth landings and taxi, plus high-efficiency carbon-carbon brakes rated for 1,000-plus landings that have a prorated warranty. Meyer believes the Sovereign has the best wheel brakes of any Citation yet built. The main tires have a design life of 300-plus landings.

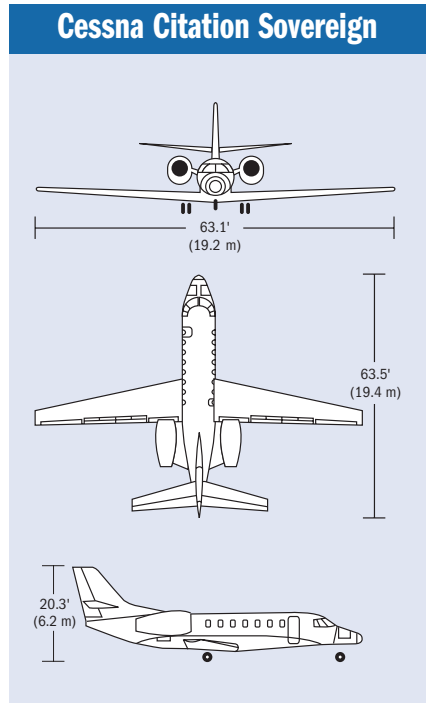
The trailing edge flaps are actuated by electrically powered jackscrews. Each wing has five multifunction spoiler panels, the center three on each wing being spoilerons. The outer panels function as spoilers in flight and lift dump spoilers on the ground.

The horizontal stabilizer has a flap/stab interconnect function, causing it to reposition between flaps 15 degrees and 35 degrees. This minimizes pitch change with configuration change. The rudder has a bleed-air-powered boost function that reduces pedal force in the event of an engine failure. The amount of boost is inversely proportionate to indicated aircraft speed, so there's very little retrimming needed after initially coping with an engine failure on takeoff. The Sovereign has the biggest rudder ever fitted to a Citation, so there's ample yaw control authority at low speeds in spite of the aircraft's 5,686-pound-thrust engines.

Low- and high-pressure engine bleed air, routed through pre-coolers in the pylons, is used for cabin pressurization,

heating and air conditioning, plus wing and horizontal stab, and engine anti-ice. Maximum cabin pressurization is 9.3 psi, sufficient to maintain a 7,250-foot cabin at a 47,000-foot cruise altitude. The Sovereign has a single air-cycle machine with high cooling capacity, which can be powered by the APU while the aircraft is on the ground. The aircraft has two-zone temperature control and a recirculation fan to boost cabin cooling when required.

A 76-cubic-foot capacity emergency oxygen bottle, mounted in the right fuselage fairing and serviceable through an external door, supplies the crew through quick-donning masks and the passengers by means of drop-down masks.



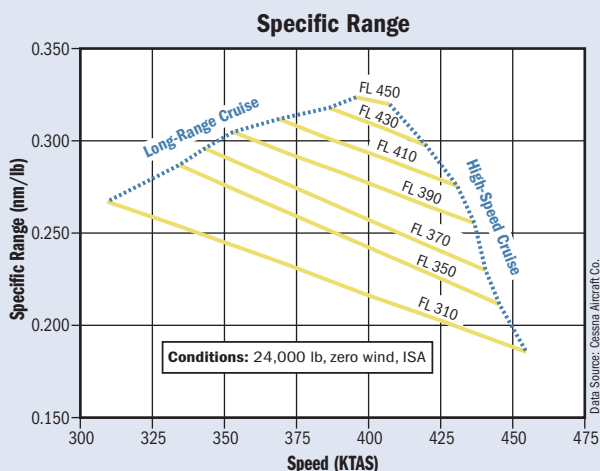
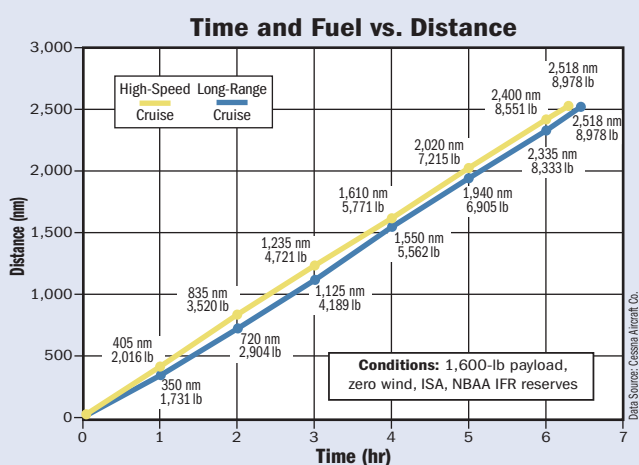
Cessna Citation Sovereign

These three graphs are designed to provide a broad sketch of the Citation Sovereign's performance, based upon projections from Cessna's engineering team. Special thanks to Dave Champley and Mike Fuhman at Cessna Aircraft for their efforts. Do not use these data for flight planning.

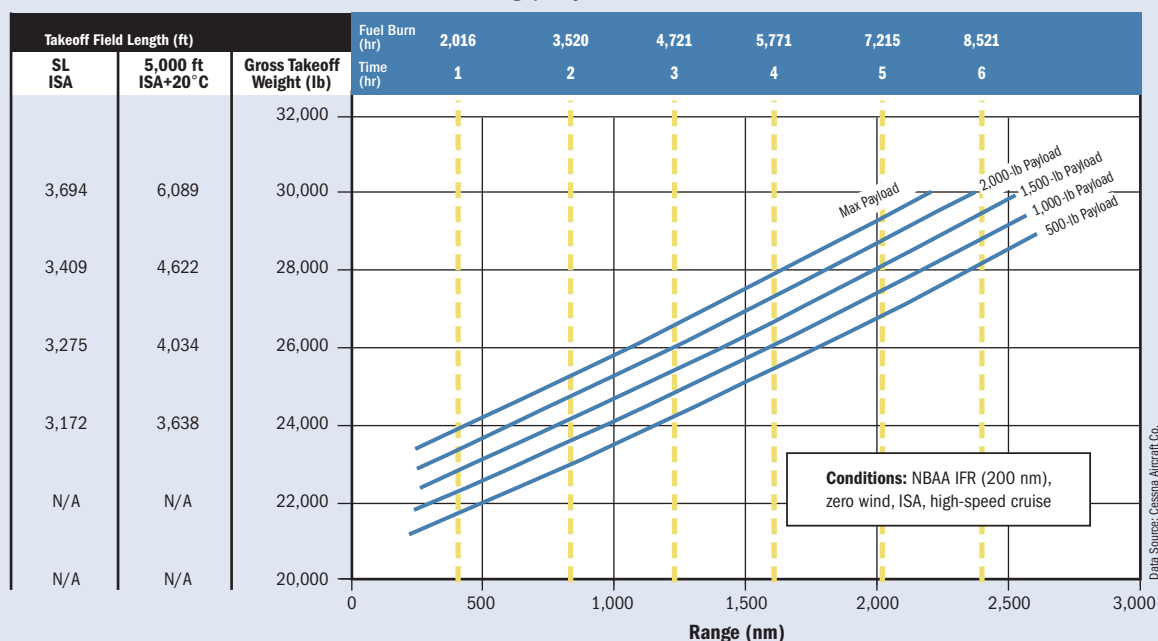
Time and Fuel Vs. Distance — This graph shows the performance of the Sovereign at 0.70 Mach recommended long-range cruise and high-speed cruise, which varies from 0.75 to 0.78 Mach, depending upon cruise altitude. The numbers at the hour lines indicate the miles flown and the fuel burned for each of the cruise profiles. It's apparent that the only difference between long-range and high-speed cruise is the time en route. Both profiles yield the same range performance.

Specific Range — This graph shows the relationship between cruise speed and fuel consumption at representative cruise altitudes for a mid-weight Sovereign. The graph indicates that specific range varies substantially from FL 330 to FL 450, indicating that the best tradeoff between speed and range is obtained above FL 410. During our evaluation flight we found Cessna's cruise performance estimates to be quite conservative. The aircraft we flew beat all Cessna's projections by a considerable margin.

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 is plotted from multiple data points supplied by Cessna, ending at the maximum range for each payload condition. The time and fuel burn dashed lines are based upon the high-speed cruise profile for a mid-weight airplane as shown in the Time and Fuel Vs. Distance chart.



Range/Payload Profile





The Sovereign is certified for two flight crewmembers and up to 12 passengers, but most cabins will be configured for eight or nine occupants.

An additional 76-cubic-foot bottle is available as an option.

Cabin Amenities and Baggage Compartments

The Sovereign is certified for two flight crewmembers and up to 12 passengers, but most cabins will be configured for eight or nine occupants. A number of eight-, nine- or 10-place configurations are available. A two-place, side-facing divan in the forward part of the cabin will be an option.

The cabin's overall length from cockpit divider to aft pressure bulkhead is 24.5 feet, according to our tape measure. Maximum width measured 5.5 feet, an inch less than Cessna advertises, because

optional sidewall trim panels were added to the aircraft we flew. Maximum height in the 13-inch-wide, full-length dropped aisle was 5.7 feet based upon our measurements, precisely the same number published by Cessna.

The main cabin, including forward refreshment center and passenger seating areas, is 19.9 feet long. All aircraft will have a full-width, aft lavatory with a flushing, externally serviced toilet. The lav is approximately 2.5 feet long and has cabin windows on both sides. It has a pair of sturdy pocket doors that extend for full privacy. The basin has hot and cold running water and a lighted vanity mirror.

Aft of the lav, there is a generously sized,



Maximum height in the 13-inch-wide, full-length dropped aisle was 5.7 feet.

full-width luggage area that's a little more than 2 feet long. The aircraft's main external baggage compartment, accessible by means of a left airstair door, has a 100-cubic-foot, 1,000-pound capacity, marking it as the largest ever installed in a Citation and one of the largest in mid- and super-size-class business aircraft. New JAR 25 certification requirements dictated that the baggage compartment meet Class C standards. It has both fire detection and a large-capacity, remotely triggered fire extinguishing system.

The Sovereign has eight cabin side windows on the right and seven on the left because of the airstair entry door. Each window is elliptical and has an electrically operated, pleated sunshade. The door has a solid feel and is nicely counterbalanced with springs. There's a sturdy handrail and each of the treads is lighted. An additional entry light on the left side of the fuselage provides ample illumination for nighttime boarding and unloading.

The aircraft we flew for this report was fitted with a typical interior, featuring double club seating for eight plus a ninth, side-facing seat adjacent to and forward of the cabin door, and an optional, large refreshment center on the forward, right side of the cabin.

NetJets, in contrast, ordered all 50 of its aircraft with a left, forward coat closet and a smaller, standard galley with a ninth, side-facing seat immediately aft.

Chairs in the double club sections are pedestal mounted, with fore/aft, pitch, recline, swivel and lateral track adjustments. A variety of audio-visual equipment is available, including a moving map display, DVD players and various individual video monitors for each seat. Facing pairs of cabin chairs have foldout worktables. Notably, Cessna now fits interiors with long-life, low-heat LED lights that should save power and weight, while substantially improving reliability. Three sizes of individual LCD monitors are available for each seat in the double club sections. An additional LCD monitor may be installed in the overhead section of the cockpit for crew use.

Both refreshment centers feature two hot beverage storage containers, an ice drawer, plenty of storage compartments, room for catering and provisions for glassware and china stowage. Options include conventional and microwave ovens, coffee brewers, custom china, glassware and utensils, and a cockpit curtain divider.

Flying Impressions

B/CA was the first to fly the Sovereign outside of Cessna's own pilots. Accom-

panied by E. Wayne Spriggs, chief test pilot, in the right seat and Brad Thress, Sovereign program manager and safety pilot, we flew the second production aircraft on its 119th mission in early June.

The aircraft had a full production interior, except that orange test equipment occupied the right half of the aft club section normally occupied by two passenger seats. Spriggs talked us through the preflight walkaround inspection, during which he pointed out the Sovereign's new high-strength, high heat pitot tubes that meet JAA ice ingestion requirements, its Primus Epic avionics components in the nose compartment and its relatively clean wing. Stall strips were added to the leading edge to trip laminar flow so as to provide pre-stall buffet over the tail plane. A half dozen small boundary layer energizers were added to the leading edges ahead of each aileron to ensure full roll control throughout the stall. Other than those devices, the wing is free of aerodynamic patchwork fixes.

Spriggs noted that the engine oil level is checked on the EICAS, along with the hydraulic fluid quantity. Oxygen pressure and battery connections, though, are examined on preflight, along with the usual leak, tire appearance and oleo checks.

The cockpit was warm, as one might expect on a sunny June morning in Wichita. Shortly after entering the cockpit, Spriggs started the APU and directed flow to the ACM. Each crew station has one overhead air outlet and two knee-level gaspers on each forward sidewall. Cooling started immediately and it was impressive. The cockpit also has overhead gill-shaped flood vents that float warm air over the pilots' outboard shoulders in winter to take the chill off the compartment. Cessna engineers paid close attention to the Sovereign's cooling and heating performance in the main cabin, as well.

Spriggs then programmed the FMSes through the MCDUs on the forward console. The MCDUs also function as radio tuning units, with one typically being used for the radios and the other for FMS functions in flight. Spriggs entered our 18,537-pound zero fuel weight and 7,100-pound fuel weight for the mission. The FMS computed ramp weight as 25,637 pounds. Spriggs also entered V speeds of 109 KIAS for V₁, 112 KIAS for rotation and 120 KIAS for V₂ takeoff OEI safety speed, based upon a 25,300-pound takeoff weight and a normal flaps 15 degrees configuration. Seven degrees of flaps may be used for certain hot-and-high conditions when improved OEI climb performance is needed and runway length is not a limiting factor.



The main cabin, including forward refreshment center and passenger seating areas, is 19.9 feet long.

At Wichita, elevation 1,240 feet and at 24°C OAT, the no-wind TOFL was 3,640 feet. Such performance computations in production aircraft, though, will be automated through the FMS boxes.

We turned off the avionics masters for engine start to avoid power surges to sensitive components.

In keeping with Citation tradition, most start functions are automatic. The start buttons have been relocated to the console, just aft of the throttles, so that either crewmember may initiate engine start. I pushed the right start button, activating the fuel boost pump and arming the ignition system. There's no need to wait until a minimum N₂ rpm before advancing the power lever. The FADEC won't initiate ignition and fuel flow until N₂ reaches 15

percent. The computer also terminates engine start in the event of a malfunction.

After starting the second engine, we switched on the generators. These normally would be left on for a battery or APU start, but they were left off because we elected to start the engines using external power. With avionics power on, it's readily apparent that Cessna was challenged to fit all flight and engine instrument display functions, along with most systems annunciations, onto the four, 8-by-10-inch display screens. As a result, DU2, the one just left of center, has engine instruments and CAS functions. There is no room for graphic systems synoptics and the screen is packed with lots of numbers, letters and symbols. DU3, the center-right display, functions as the MFD for



Facing pairs of cabin chairs have foldout worktables.



The Sovereign's 16-degree mildly swept wing leading edge and moderately super-critical airfoil shape enable it to cruise as fast as 0.796 Mach, or 454 KTAS at ISA-2°C, based upon our observations.

both pilot and copilot. Less is more with LCDs, in our opinion. All four displays could benefit from some attention to the quiet, dark cockpit design school embraced by other manufacturers. This also involves more restrained use of colors, symbols and alphanumeric characters.

We called for taxi and released the brakes. At just over 25,000 pounds, the aircraft started rolling at idle thrust. Maneuvering the aircraft is easy because of the hydraulically powered, rudder pedal and tiller controlled nosewheel steering. We found it advisable, though, to use the tiller for taxiing rather than the rudder pedals because the rudder will weathervane in light breezes and it has plenty of inertia.

Such rudder movement is fed back through the pedals, and thus the nose-wheel steering, if they're not held in place by one's feet.

The Sovereign's wheel brakes have a nice feel, but they're slightly touchy when cold. As soon as they've warmed slightly, though, they're less sensitive and even more effective. During the taxi to Runway 19R, we checked the thrust reverser and rudder boost systems.

Spriggs briefed a static run-up to full rated thrust. We advanced the power levers three detents, max cruise, max continuous and takeoff, waited for the gauges to stabilize and released the brakes.

Whoa. We wouldn't suggest this tech-

nique with your CEO on board. The lightly loaded aircraft, with a better than 2.2-to-1 weight-to-thrust ratio, leapt forward impressively. At an auctioneer's cadence, Spriggs called airspeed alive, crosscheck, V1, rotate, V2 and positive rate. Ten minutes after takeoff, we were level at FL 310, awaiting higher altitude climb clearance from Center. Twenty-four minutes after takeoff, including a couple of intermediate level-offs for more than two minutes, we were level at FL 430, having burned 1,050 pounds of Jet-A to get there.

The Sovereign at 24,000 pounds accelerated to 0.761 Mach, equivalent to 433 KTAS in ISA-3°C conditions. Total fuel flow was 1,460 pph. Cessna promised 421 KTAS on 1,415 pph, so the Sovereign cruised 12 knots faster than book with virtually the same specific range performance.

During the climb and while in cruise, we evaluated the aircraft's handling qualities. The Sovereign has manually operated primary flight controls. Roll control force proved to be excessive at high speed, so Cessna engineers added a variable gearing mechanism to the ailerons, a first for any business aircraft. This increases the mechanical advantage between the yoke and ailerons at high speed, thereby reducing force. It works well to reduce roll control force, but roll effort still increases with speed, a quality we find desirable. At high speed, roll control force feels about the same as in a Gulfstream IV, an aircraft that uses hydraulically boosted flight controls.

The Sovereign's aileron control linkage, though, does have some on-center free play that may be tuned out of production aircraft.

We then checked long period pitch stability and yaw-roll coupling. The aircraft was positively damped in both axes, having a 65-second phugoid cycle and four-second yaw cycle. However, it wasn't heavily damped, so we recommend flying the aircraft with the yaw damper on. The Sovereign is pleasant to hand-fly, thus we elected not to use the autopilot for the remainder of the mission. We also checked high-speed buffet margins at FL 430. At 24,000 pounds, we could push the aircraft to nearly two g's in a wind-up turn before encountering buffet, in large part because of its amply sized, super-critical wing.

At FL 390, we checked high-speed cruise performance. With weight down to 23,900 pounds, the aircraft nudged its 0.80 Mach MMO redline, cruising along at 0.796 Mach or 454 KTAS on 1,780 pph. Cessna predicted 0.76 Mach or 437 KTAS with essentially the same fuel mileage.

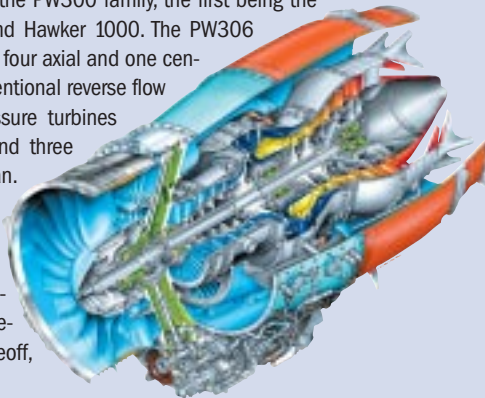
Next, we descended to 16,500 feet in

Pratt & Whitney Canada PW306C Turbofans

The Sovereign is the third application for the Pratt & Whitney Canada PW306 turbofan. The engine went through its growing pains on the Dornier 328JET regional jetliner in the -A version and the Galaxy/G200 in the -B version, both with higher takeoff thrust ratings than the -C version fitted to the newest Citation. Now, the 306 is a mature engine, so reliability should be excellent.

The engine is the second variant of the PW300 family, the first being the PW305 that powers the Learjet 60 and Hawker 1000. The PW306 features a wide-chord, damperless fan, four axial and one centrifugal compressor stages, and a conventional reverse flow combustor, followed by two high-pressure turbines that power the compressor section and three low-pressure turbines that power the fan. A deep fluted mixer nozzle reduces noise emissions and improves high-altitude thrust performance.

The engine is fitted with a dual-channel FADEC and is controlled by a throttle-by-wire thrust lever with detents for takeoff, climb and cruise.





The main landing gear use a trailing link design for smooth landings and taxi.

VMC for basic airwork. The Sovereign's center three spoiler panels are actuated by a variable control lever. Extending the three panels produces almost imperceptible pitch up and very little airframe rumble. The control lever has a stop beyond which moving the lever aft causes the remaining outboard and inboard panels to extend fully. This causes a slight, but noticeable increase in airframe buffet.

Extending or retracting the landing gear causes almost no pitch change. Extending the flaps to 7 or 15 degrees causes a slight pitching moment that's easy to counter with a small push on the yoke. There's a more pronounced pitch change when moving the flaps from 15 degrees to 35 degrees, but a flap/stab interconnect compensates for almost all of it.

Benign stall characteristics are the Sovereign's strong suit. Clean and dirty stalls are preceded by a stall-warning stick shaker. Mild airframe buffet warns of the aerodynamic stall. At full aft stick, aircraft buffet increases and the nose mashes down. There is full aileron control throughout the stall and recovery. If one simply lets go of the yoke, the Sovereign will recover from the stall on its own.

Returning to Wichita, we slowed for a normal, two-engine VFR, straight-in approach. The Sovereign's thrust response to small throttle movements at low power is linear and easily modulated, a nice contrast to other Pratt & Whitney Canada PW306 aircraft we've flown. Cessna's engineers paid close attention to refining throttle response, a characteristic that operators should appreciate.

Aircraft weight for the first landing was 23,000 pounds, resulting in a VREF of 101 KIAS. Crossing the threshold, we slowly

reduced thrust to idle and began the flare at 50 feet. The Sovereign's large wing and generous flaps cause plenty of ground effect to cushion the landing. The long-travel, trailing link landing gear soak up imperfections in touchdown technique. Spriggs repositioned the flaps to 15 degrees and retrimmed the aircraft for a touch-and-go.

Our next approach was simulated one-engine-inoperative. Spriggs retarded the right throttle to idle. We noticed the rudder boost system move the pedals in response to help counter the adverse yaw. We reset VREF to 108 KIAS and planned for a flaps 15 degrees landing. The aircraft was easy to control. Close to touchdown, we executed a balked landing to evaluate handling qualities. Rudder boost reduced the pedal force needed to less than 50 pounds, but we still needed to push the right pedal almost all the way to the floor to neutralize the skid.

Our second landing was a simulated OEI maneuver. We made a full stop and taxied back for one more circuit in the



All of the landing gear have dual wheels.

VFR pattern. This time, Spriggs pulled the left throttle to idle just as we achieved V1. Again, required rudder pedal force was very moderate because of the rudder boost assist. After cleaning up the airplane and turning downwind, we configured the air-



Honeywell Primus Epic Avionics

The Sovereign, similar to several new business aircraft, is equipped with Honeywell's Primus Epic avionics suite that features large-format flat-panel displays, modular avionics units (MAUs) that host several functions, and modular Primus Epic radios that are smaller and lighter than the last generation of Primus II radios. All the units are tied together by the latest version of Honeywell's Avionics Standard Communications Bus local area network. The standard package includes a Primus 880 Doppler turbulence detection weather radar, dual DADCs with RVSM certification, dual FMS cards, Honeywell Enhanced GPWS, TCAS II, dual GPS receivers and a single radio altimeter. Rockwell Collins supplies the AHC-3000 AHRS.

Optional equipment includes an HF radio, SELCAL, a second ADF receiver, a CD-ROM reader for navigation database updating, an FMS performance computation function and Honeywell's AFIS. Also available are a flight data recorder, a lightning sensor system, a variety of satcom phones, a passenger briefing system and cabin audio-visual systems.

craft, then at a weight of 22,000 pounds, for a normal landing. VREF was 99 KIAS, so we made sure that no one was behind us on final, other than single-engine Cessnas. Tower, however, directed us to turn off the runway as soon as practicable because, by then, we had a regional jet in trail.

Obliging the request, we used moderate braking to stop the aircraft by the intersection of the crosswind runway. We had to add thrust to continue on to the next taxiway. The Sovereign's brakes are impressively powerful, but we didn't approach their full capabilities.

Total flight time for the mission was one hour, 44 minutes, with a fuel burn of 2,900 pounds from start-up to shutdown.

Our conclusions? The Sovereign is the nicest handling Citation yet built. Few aircraft are easier to fly and more immediately confidence-inspiring.

Closing In On Certification and Initial Deliveries

Cessna reports 109 orders for the Sovereign, with 22 deliveries scheduled for 2004, 38 in 2005 and 48 in 2006. The next available delivery is May 2006. While the newest Citation may not be Cessna's bestseller in terms of production units, it's likely to be its most successful financially.

"Let me make a bold prediction," Meyer said. "In the Sovereign's first five years of

production, it's absolutely going to be our most successful Citation." Meyer believes that a three to three-and-one-half unit per month production rate can be sustained for the next eight to 10 years.

Most Sovereign buyers are upgrading from smaller, shorter-range Citations, especially the Excel. "They're purchasing just one or two aircraft," Meyer explained. "The Sovereign tends to be the queen of their fleet, if they have more than one aircraft."

But Meyer also believes that a substantial number of heavy-iron operators will be Sovereign customers. "There were a lot of *Fortune* 200 companies that gravitated toward a fleet of large aircraft in recent years because of the roaring economy," Meyers noted. "But 80 percent of their missions could be flown in midsize aircraft. Now they're looking to do things more efficiently. In the face of austerity and shareholder concerns, we believe the Sovereign is the right airplane for all those one- to one-and-one-half-hour missions during which they carry two, three or four passengers."

Meyer also claims that the Sovereign is a true coast-to-coast range aircraft, having an eight passenger range of 2,500-plus miles with 200 nm NBAA IFR reserves. Industry observers, however, told *B/CA* that a minimum range of 3,000 miles is needed to fly New York to Los Angeles in the real world of climb restrictions, delay vectors and stronger-than-forecast winter headwinds. But Meyer asserts that the aircraft will prove to have enough range. Judging from Cessna's blatantly conservative published cruise performance number, he might be correct.

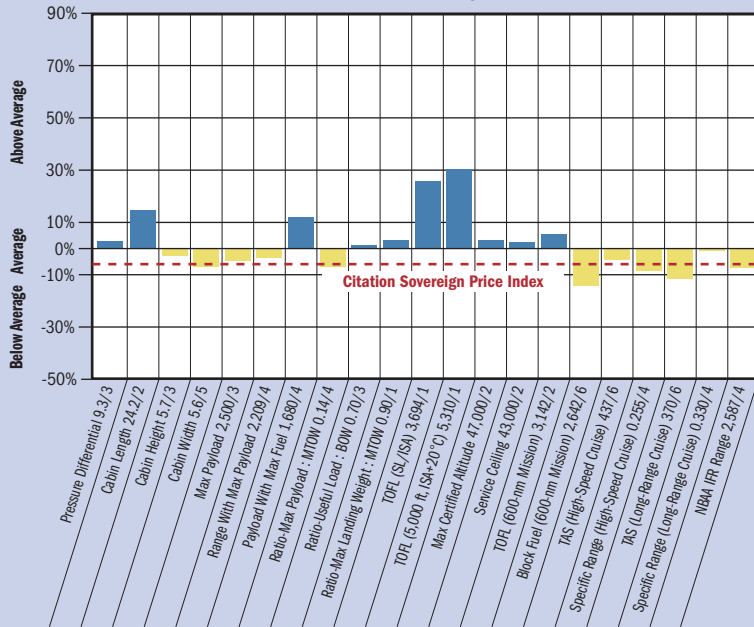
"We've never had an airplane that could conveniently find its way into so many flight operations," Meyer explained. "If it's the right airplane for the mission, it's the only alternative."

As illustrated in the accompanying Comparison Profile®, the Sovereign shows well against current production midsize aircraft, especially in terms of cabin size, short field performance and high-altitude cruise. It's also the first midsize Citation in recent production to have nearly a tanks-full, seats-full payload capability, a feature highly valued by operators. Factor in its \$13.5 million price tag and the Sovereign gains a 6-plus-percent advantage over the composite average in our comparison.

The Sovereign's balance of cabin comfort, performance and price mark it as one of the most versatile Citations ever built and make it Cessna's most competitive midsize aircraft yet introduced. **B/CA**

B/CA Comparison Profile® Citation Sovereign

(Percent Relative to Average)



Tradeoffs are a reality of aircraft design, although engineers attempt to optimize the blend of capabilities, performance and passenger comfort.

B/CA compares the subject aircraft, in this case the Citation Sovereign, with the composite characteristics of others in its class, computing the percentage differences for various parameters in order to portray the aircraft's relative strengths and weaknesses. We also include the absolute value of each parameter, along with the relative ranking, for the subject aircraft within the composite group.

This Comparison Profile compares the Citation Sovereign with a wide-ranging composite group including it and the Gulfstream G100 (née Astra SPX), Bombardier Learjet 60 and Raytheon Hawker 800XP in the midsize class, plus the Bombardier Challenger 300 (née Continental) and Raytheon Hawker Horizon in the super midsize class. The Comparison Profile shows that the Citation Sovereign's cabin length, tanks-full payload and takeoff field length performance compare favorably with the composite average. Its cruise speed and fuel efficiency, in contrast, are not quite up to those of the composite average. But the Sovereign's price index is 6-plus-percent less than the average for this class of aircraft, so it's a strong performer for the dollar relative to others in its class.