Pilot Report: Cessna Citation Longitude

Providing best in class passenger comfort while lowering pilot workload

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This article appeared in the March 2021 issue of Business & Commercial Aviation magazine, available here: https://view.aviationweek.com/p/1

A little-known secret outside the world of business jet pilots is that we are more than the occupants of the front two seats, pushing throttles, magically seeing through clouds, and circumnavigating the world. [Italics start] *Sure, there is that.* [Italics end] But we are also the flight planners, baggage loaders, and flight pursers. In some cases, we are the flight attendants and flight line service technicians. If we aren't the mechanics, we are the mechanic's diagnostician or assistant. It is with due respect to all these "hats" that I measure the effectiveness of a new business jet: how does the design make the pilot's life easier? Under these metrics, the Cessna Citation Longitude is a winning design.

My introduction to Cessna jets was over forty years ago, flying the Cessna T-37 "Tweet" as an Air Force student pilot. We lieutenants were told that Cessna took the lessons learned from the primary jet trainer and turned those into the first Cessna business jet, the Citation I.

So when Textron Aviation offered me the chance to fly a new Longitude, I jumped at the chance. With 31 Longitudes already delivered, as of early 2021, the aircraft may be setting a new standard in the super-midsize business jet class.

The Exterior Preflight

The Citation Longitude has an elegant ramp presence, with its 68 ft. 11 in. wingspan and 73 ft. 2 in. length, a graceful 28.6- to 31.8-degree wing sweep and T-tail perched 19 ft. 5 in. in the air. Crews can comfortably plan on starting flight preparations with as little as 30 minutes before departure without feeling rushed. As this was an introductory flight for me, Textron Aviation demonstration pilots Captains Alan Pitcher and David Bodlak allowed for an hour.

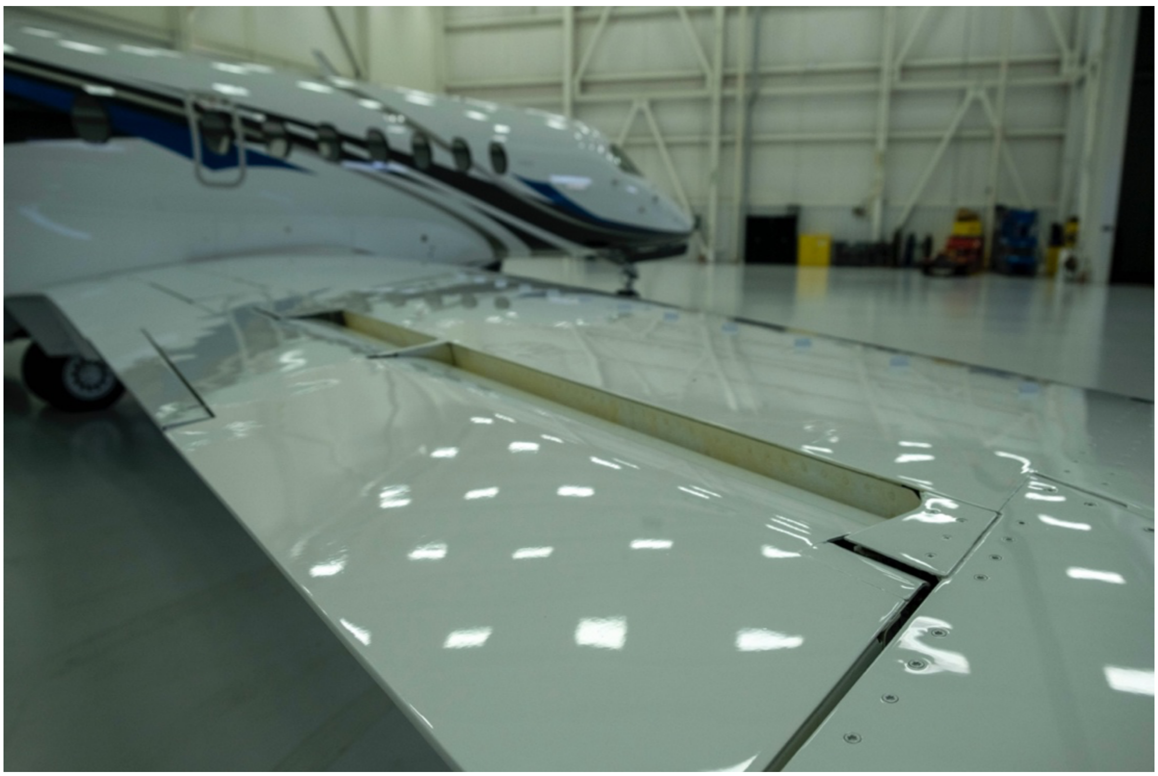
Not too long ago, a typical exterior preflight inspection took about an hour and often left the pilot or flight engineer dirty with grease and oil. Even today, many preflights require pilots to open panels, examine engine accessories, and get into wheel wells with a flashlight. There is a certain satisfaction from all that, but it gets old quickly. I got the sense we could have it done in five minutes if not for all my questions.

The main entrance door is electrically closed by a DC-motor and allowed to free fall on its own while unspooling the motor. The door includes a sight glass to ensure the ramp is clear prior to opening and a sensor to prevent the door from closing if anyone is still standing on it. (I will be adding this to my wish list on my future aircraft!) The door is surrounded by a “blade type” seal which simply uses cabin pressure to seal the door to the aircraft’s maximum pressure of 9.66 Pounds Per Square Inch Differential (PSID). That is a recurring theme with the Longitude: if there is a simple solution to something that is traditionally handled in a more complex way, go with simplicity. The door doesn’t require an inflatable seal and all the pneumatic plumbing between it and bleed air sources required to power it. Despite all that, the pressurization system is capable of delivering a remarkable sub-6000-foot cabin altitude at the aircraft’s 45,000-foot maximum altitude.

Just about all the inspection panels are accessible without a ladder or the need to crawl underneath the aircraft. But only one really needs to be opened on a routine preflight inspection: the refueling control panel, located in the fairing just forward of the starboard wing. The aircraft is capable of carrying 14,300 lbs. of fuel in two integral wing fuel tanks. If fueled using the overwing filler caps, total fuel increases to 14,500 lbs. The control panel doesn’t require a long boot process and took less than five seconds to report the fuel onboard. The pilot need only turn the fuel panel switch on and select the total amount desired. The system will ensure the fuel between each wing tank remains within 500 lbs. balance until the desired fuel is loaded.

For our flight, we loaded 9,200 lbs. for a short local flight with three of us onboard, expecting a takeoff weight of 32,965 lbs. Our takeoff from Dwight D. Eisenhower National Airport, Wichita, Kansas (KICT) was at 12 degrees C, on a dry runway. The aircraft’s published performance at a maximum takeoff weight of 39,500 lbs. from a sea level, ISA airport allows for a takeoff field length of 4,810 ft, a 3,500 nautical mile range flying at 0.80 Mach, with four passengers and NBAA IFR reserves. For today's flight, we would need just 3,583 feet of runway.

The wings appear clean from the front and top, with no leading edge devices needed to achieve its short runway performance. The polished leading edge uses for hot pneumatic bleed air to provide evaporative anti-icing. This system is also used for the ring cowls of the engines. Two full-time ice detectors, a first in the Citation series, are used to advise pilots of the need to activate anti-ice systems. The wing, from root to the gentle upsweep of the winglet struck me as beautiful. Beautiful, that is, until I got to the aileron.



The right aileron outboard and three spoilers inboard

"Tell me about roll control," I asked Captain Pitcher. He explained that the aileron system was strictly cables and pulleys between a conventional yoke and the aileron surfaces. That is augmented by fly-by-wire spoilers above the wing which are electrically controlled and hydraulically operated. The two outboard and midboard spoilers act as roll spoilers and speed brakes. A set of inboard spoilers team up with the other four as ground spoilers for landing or aborted takeoffs. The setup appeared similar to many of the aircraft in my logbook but I wondered about any drag or aileron buzz caused by the abrupt shape of the wing-to-aileron union. I made a mental note to fly the aircraft at its highest speed to find out.

The two Honeywell HTF7700L turbofan engines are installed on pylons just aft of the wings. They incorporate dual channel Full Authority Digital Electronic Controls (FADEC), producing

7,665 lbs. thrust on an ISA day at sea level, flat rated through ISA+14°C. The engines are just above eye level for me, I would need a ladder to install intake covers.

Walking aft I noticed the polished leading edges of the horizontal stabilizer as Pitcher talked about the EMEDs. "E-whats?" I asked. The Electro-Magnetic Expulsion De-icing (EMED) system uses DC electrical power to pulse magnets mounted inside the leading edges to create skin movement to free ice from leading edge of the horizontal stabilizer.

Next up was a view of the APU exhaust mounted at the aftmost point of the fuselage. Moving the APU exhaust as far aft as possible is credited with lowering cabin noise significantly, as is moving the cabin pressurization outflow valve to aft bulkhead in the baggage compartment. The Longitude's a cabin noise level is less than 68 decibels, as compared to between 69 and 72 for its nearest competitors.

Of course, most of us business jet pilots spend a great deal of time handling baggage and the Longitude's external and internal baggage compartment access are designed with this in mind. The external compartment door can be opened and closed without a ladder and the baggage compartment floor is just over four feet off the ground. The internal door also gives access from the cabin to the entire baggage compartment, which has a flat floor.

The port side fuselage behind the wing is home to potable water and lavatory water service. The lavatory is a vacuum type with grey water contained outside the pressure vessel in a 6.5-gallon heated tank. A 14-gallon potable water tank can be serviced internally or externally. It can also be purged while in flight from a selection from cockpit screens, reducing pilot postflight cold weather chores to having the gray water dumped and removing any freezables from the cabin.

Finishing the external preflight, I again thought the overall theme had been simplicity: how can we make these necessary chores as painless as possible for the pilot? It was a theme that was to continue in the cockpit.

The Internal Preflight

1. Touchscreen LCD Control Panel	8. Pressurization and Environmental Control Panel
2. Primary Flight Display (PFD)	9. Flight Guidance Panel - FGP
3. Secondary PFD Controller	10. LH Tilt Panel
4. Master Caution and Master Warning Annunciations	11. RH Tilt Panel
5. Multi-Function Display (MFD)	12. Engine Throttle Levers with Thrust Reverser and Autothrottle Controls
6. Dual Touchscreen LCD Control Panels	13. Flaps Control
7. Electronic Standby Flight Display - ESFD	14. Parking Brake Handle

The Longitude's cockpit

For a pilot coming from larger aircraft, the Longitude's cockpit can seem a bit small. The fuselage, at its widest point, is 77 inches wide and 72 inches tall. Pilots without previous Citation experience, like me, will be impressed by the large windshields and windows, providing excellent visibility. I lowered myself in the left seat and felt immediately at home with the five-point restraining harness and comfortable leather seats.

With the press of two battery switches, the cockpit came to life and the boot process was no more than a few minutes. The Flight Management System (FMS) comes up automatically, and with it, the navigation lights turn on. It appeared the G5000 Garmin Integrated Flight Deck (GIFD) put as much glass as they could fit in front of both pilots. Three 14-inch-diagonal, high-resolution Liquid Crystal Displays (LCD) in wide screen, landscape orientation are home to two outer Primary Flight Displays (PFDs) and a single, centrally located Multi-Function Display (MFD). Each display can be split with a push of a button.

Four full-color touch screen LCD control panels, called Garmin Touchscreen Control panels (GTCs), are used to manipulate G5000 system features such as radio tuning, transponders, intercom, flight planning, selected aircraft systems such as environmental control and internal lighting, and MFD windows to display desired information. If a control panel becomes inoperative, the remaining control panels can take on additional control responsibilities.

While I've spent most my flying career using cockpit avionics from Honeywell and Collins, I felt immediately at home with the Garmin setup. The GTCs are much easier to use than a conventional mechanical button control panel, and even easier than the touchscreen controls that I normally use. The Garmin version puts far less information on any given screen, meaning the numbers and letters displayed can be larger. Because your fingers have larger targets to hit, the chance of punching a wrong number or letter are decreased as a result. You rarely have to dive in more than a few levels to find what you want.

Unlike many AC driven aircraft, the almost entirely DC Longitude is "full up" on batteries only, except for the windshield heats. Once the avionics boot up, you have a cockpit ready to go. The only thing remaining before starting the engines is to connect external air or fire up the Auxiliary Power Unit (APU). The batteries are good for at least ten minutes prior to APU start, so pilots do not need to hurry through any procedures before getting to the APU.

The Honeywell 36-150 APU is certified to start up to 31,000 ft and operate to 35,000 ft. It provides electrical power as well as bleed air for environmental controls and engine starting while on the ground and at lower altitudes in the air. Unlike any APU I've ever operated, this one is certified for unattended operation. Pilots can start the APU with full confidence that it will not only shut down on its own if needed, it will also discharge a fire extinguisher. I immediately added this to the wish list for my aircraft.

Starting the APU could not be easier. You simply rotate the APU control switch from OFF to ON, wait about 15-seconds for a self-test to complete, and then rotate the switch to START. Pilots are relieved of the normal prestart routine (turning on navigation lights, selecting fuel pumps, running a fire detection test) and the entire process takes less than a minute.

The Longitude can be equipped with Inertial Reference Units that automatically update off of the installed dual Global Positioning Satellite (GPS) receivers, or two Litef LCR-100 gyrocompassing Attitude Heading Reference System (AHRS) computers. The units come to life automatically during power up and flight plans and weather information can be downlinked by ground or satellite links. The system automatically favors VHF terrestrial sources, if available.

Preflight checks were straight forward and easily accomplished, and we were ready for engine start in just a few minutes. A trained crew can routinely go from a dark cockpit to engine start in less than ten minutes. Even with my incessant questions and Captain Pitcher's detailed answers, we were ready in twenty.

Engine Start

Three minutes after the APU is started, bleed air will be available, and the engines will be ready for start as soon as the Before Start Checklist is completed. Pushing either engine's FADEC RUN/STOP button sends air to the starter and as soon as 32 psi is indicated, the START button can be pressed. We got the 32 psi in just a few seconds and it seemed to me each engine start took less than 30 seconds. I could barely hear the engines from the cockpit.

After engine start, I checked the flight controls in each axis, as well as the speedbrakes. I was a little surprised by the amount of force needed to move the ailerons full throw, but the elevator moved more easily. (Both are fully mechanical with no hydraulic assist.) The rudder is electrically controlled, hydraulically actuated; and it moved easily.

Taxi was effortless with the airplane gently starting to roll as I released the brakes. The nose wheel steering uses a mechanical linkage from a left seat tiller and from both sets of rudder pedals to drive a hydraulically assisted nosewheel steering assembly. The tiller provides up to 80 - 81° nose wheel deflection, the rudder pedals provide up to 7-1/2 degrees; both can add up for a total of 88-degress left or right of center. The tiller felt heavier than I expected, but that made it easier make smooth movements.

The wheel brakes are actuated conventionally. The multi-disk, anti-skid carbon brake system is electronically controlled and hydraulically actuated. This kind of "brake by wire" is new for the Citation lineup, but they seemed to have gotten it right. Brakes are not overly sensitive and were effective.

We selected "Flaps 2" for takeoff. The electric flaps are motor driven to three positions: Flaps 1 gives you 7 degrees of flaps, Flaps 2 gives you 15 degrees, and Flaps Full gives you 35 degrees. The difference from minimum to maximum can reduce approach speeds by as much as 33 knots.

The two center Garmin Touch Screen Control (GTC) panels

Switching from clearance delivery to ground control and to tower frequencies made me appreciate a design decision Garmin made with their touch screen control panels. They placed primary radio data information on top and included mechanical interfaces on bottom. With other designs, pilots are required to activate the communications page with a swipe of the screen, and then punch in the frequency and then select the appropriate radio. With the GTC the frequency is always in view and can be changed by simply selecting it. Volume changes are as simple as a twist of the knob. The three physical controls on bottom have a myriad of uses, all making the pilot-to-avionics interface simpler.

This kind of mix between glass and physical switches can seem to be a step backwards to the days of partial glass cockpits of a few decades ago. But I think it might be a correction from other designs that have gone too far. My “other job” is flying a Gulfstream GVII where almost all conventional “hard” switches have gone “soft.” Responding to a request to ident, for example, has become somewhat more complicated in the brave new world. Depending on which page a touch screen is left, getting to an ident button can involve a swipe of the screen or a press of page tab before the ident button can be found. The process gets easier with practice and muscle-memory; but you have to add all the other tasks requiring similar screen gymnastics to your learning curve. With other, more conventional, aircraft, you simply find the physical button and press it. With the Longitude, most of these conventional “hard” switches remain hard. Of course, hard switches are more expensive. But it does make pilot tasks easier.

Takeoff, Climb, and Cruise

We were cleared for takeoff on Runway 01 Right and the FADEC controlled engines allowed me to simply push the throttles full forward. Hitting the Takeoff/Go Around (TO/GA) buttons earlier armed the autothrottles, which took over after I pushed them full forward. The engines responded quickly to takeoff thrust. Keeping the aircraft aligned with the runway centerline was simply a matter of steering with my feet and each V-speed came quickly. Our V_1, decision speed was 107 knots, rotation speed was 113 knots, and V_2, takeoff safety speed was 125 knots. As with many over-powered aircraft, these speeds seem to be of little consequence with all engines operating: they come and go very quickly.

A gentle pull to what looked to be around 10 degrees of pitch allowed us to alight gently and we were airborne. Pull forces were not substantial and it was easy to bring the nose up without over-rotating. If there was any pitch change due to flap retraction, I didn't notice it, I was too busy adding nose down trim to compensate for our rapid acceleration. The flaps had just made it to their fully retracted position when we were asked to turn 40-degrees. Here again the aileron forces seemed heavy, reminding me my days flying a Gulfstream III. But I soon got used to needing more muscle power in the roll axis and after a while I forgot it was ever a concern. Capturing and holding a 250-knot climb speed was easily done and passing about 10,000 feet I decided to give the autopilot the fun of flying the airplane while I turned my attention to navigation and other cockpit duties. The autopilot accelerated us to 270 knots until 0.76 Mach, which it then maintained.

Testing VMO at 40,000 feet

We made it to Flight Level 400 in less than twenty minutes. I opted for an altitude less than 41,000 feet to keep the crew off oxygen; 45,000 feet was easily within our reach. I wanted to see the aircraft at its maximum speed and it easily accelerated to 0.84 Mach. As we nibbled into the red and white "barber pole" of the airspeed tape, the autothrottles gently reduced our thrust to keep us right at Mach-Maximum Operating (M_{MO}). Roll control remained responsive and I did not detect any aileron buzz or other signs that my earlier concerns about a less than laminar flow off the ailerons were valid. In fact, other than the PFD indication, we had no other signs the aircraft was at its maximum speed, not even an aural clacker.

The "good manners" of the aircraft's handling at high altitude and high speed prompted a lot of questions on my part about the Longitude's partial Fly-By-Wire (FBW) system. While the ailerons and elevators are strictly conventional cables and pulleys that you would have found on the Citation I, which was certified over fifty years ago, the rudder, spoilers, brakes, and throttles use concepts unheard of back then. Many of us equate FBW with the old Airbus versus Boeing debate, arguing if the aircraft should have the ability to override the pilot. That debate is no longer valid, as Boeing has adopted FBW in its latest aircraft and Airbus has tweaked its version of FBW to prevent accidents like the June 26, 1988 crash of an Airbus A320 during an airshow at Basel/Mulhouse-Euro Airport (BSL/LFSB), France. In that incident, the aircraft decided it was landing just as the pilot decided he was going around. In an odd twist of fate, a Boeing 777 had a similar accident on August 3, 2016 at Dubai International Airport (OMDB), The United Arab Emirates. What those aircraft have in common are flight control computers which can make decisions and can, indeed, override pilot decisions.

The partial FBW on the Longitude is different, in fact very different. One of the advantages of FBW is a drastic reduction in weight and space requirements for all those cables and pulleys. Placing electrons between the pilot and the flight controls also allows more precise control when the pilot might be too busy or simply unable to provide the precision needed. The speed envelope provides a good illustration of this in the Longitude.

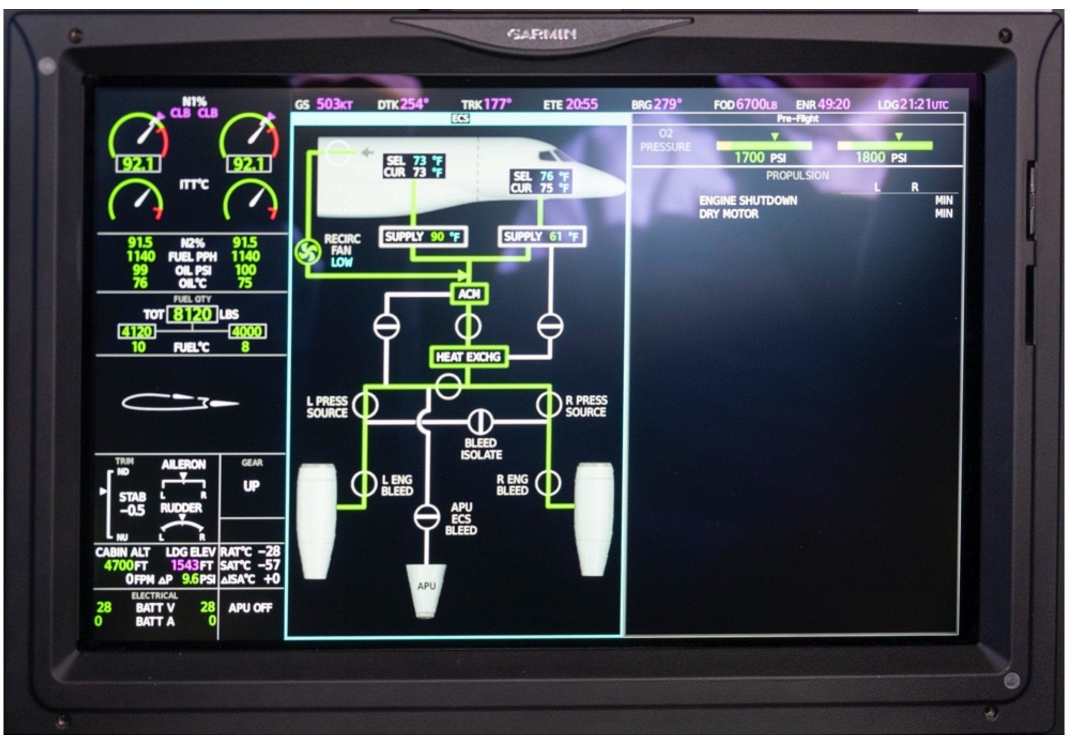
If you fly too fast and the autothrottles are engaged, the airplane has the good sense to bring the throttles back just far enough to keep you at the limiting speed. If the autothrottles are not engaged, they will automatically engage to retard the throttles. The aircraft will not automatically adjust pitch in an effort to reduce speed, but the flight director will provide the pilot with pitch up commands. If you fly too slowly, the autothrottles will advance and if the speedbrakes are deployed, they will automatically stow. The aircraft is also equipped with a conventional stick shaker and pusher.

The aircraft includes an Emergency Depressurization Mode (EDM), which activates if cabin pressure exceeds 14,700 feet, provided the autopilot is engaged and the aircraft is above 30,000 feet. In this situation, the aircraft will turn 90 degrees left, the autothrottles will retard to idle, and the aircraft will descend 15,000 feet at M_{MO}/V_{MO}. Once level at 15,000 feet, the autothrottles advance to provide a safe margin above stall speed. This automatic descent is becoming more or less standard on many high-altitude business jets, but the selection of

30,000 feet as the minimum altitude for an EDM is not. Most of the aircraft that I've flown use 40,000 feet, a number that is too high in my opinion. Isn't 39,000 feet just as much a problem? I like the 30,000-foot solution better.

The FBW rudder is electrically controlled and hydraulically actuated and feels perfectly conventional in all respects. In a way, many aircraft have a bit of FBW in the rudder, like the Longitude, with electronic yaw dampers and turn coordinators. The FBW spoilers also feel perfectly conventional inflight, helping to crisp up the roll rate of those cable driven ailerons and to increase the descent rate when used as speed brakes. The speed brake handle is large and gives a good tactile sensation of how much is being used. The gentle buffet of the airflow from the spoilers to the tail was hardly noticeable.

Pilots who don't trust these "Buck Rogers" FBW aircraft will have nothing to fear from the Longitude in that there are no flight control computers to take control away from the pilot, aside from a gentle movement of the throttles when flying too fast or slow. As a former FBW-phobic pilot I would warn these wary pilots that full FBW is inevitable; nothing beats a flight control computer for extracting maximum performance and efficiency from an airframe. But I digress! The Longitude's hybrid system reduces weight, increases efficiency, and is really transparent to the pilot.



Environmental Control System synoptic at 40,000 feet

Cruising at 40,000 feet I noted our cabin was at 4,700 feet with a 9.6 PSID. Even at 45,000 feet, the cabin altitude would be below 6,000 ft. with a 9.66 PSID. While not the lowest I've seen in a business jet, it is easily the lowest for a super midsize business jet. The Longitude achieves this performance with an air conditioning system setup I have not seen before. A single Air Cycle Machine (ACM) is paired with a Heat Exchanger (HE) which provides significant weight savings over a more conventional dual ACM solution. Combined, they provide the low cabin altitudes while the aircraft is at its ceiling of 45,000 feet; alone either the ACM or HE can do the same up to 41,000 feet. A small portion of the air is recycled through High-Efficiency Particulate Air (HEPA) filters and all cabin air is exchanged every 2-1/2 minutes.

Also notable was the noise, or the lack of it, even in the cockpit. Many aircraft tend to get noticeably louder at high speeds, the air rushing around the nose giving the loudest impact in the cockpit. I did not sense any of that effect in the Longitude, which has the lowest noise level in class.

Descent and Landing

Finishing our air work, I turned us toward Hutchinson Regional Airport, Kansas (KHUT). Using a combination of vertical navigation (VNAV) and vertical speed commands made descent planning easy and the flight management system helped position us for the RNAV(GPS) Runway 31 approach. We accepted vectors from Wichita Approach Control and configured with Flaps 1 and slowed to 200 knots. The navigation display simplified descent planning while the moving aircraft symbol overlayed on the Jeppesen approach plate increased situational awareness. A few miles outside the final approach fix I asked for Flaps 2 and slowed further to 160 knots. The autopilot handled the speed and configuration changes easily and I did not perceive any adverse G-loading found in some aircraft as flaps are extended. My plan was to allow the autopilot and autothrottles to bring the airplane down to LPV minimums, 250 feet above the runway, and then go around as if missing the approach. With the vertical path a dot above us, I asked for the landing gear which extended quickly and placed us ready for our descent. I delayed the last notch of flaps until we were established on about a 700 feet per minute descent and then asked for “Flaps Full.”

The autopilot commanded about a five- to eight-degree pitch change with the flaps and gradually returned the pitch to just a few degrees above the horizon as the airspeed settled at 140 knots. I didn’t feel any decrease in G-loading, but the pitch change took me by surprise. Captain Pitcher explained that the 140-knot bug speed was selectable by the pilot and would automatically reduce to V_{REF} with 2 nm to go. That distance was also pilot selectable.

The artificially high approach speed is a common practice among jets capable of lower V_{REF}s, helping to expedite the approach while not hindering following traffic. I wasn’t sure about the 2 nm distance, however. On a 3-degree glide path that leaves just over 600 feet to go and just over 100 feet to become stable by the industry standard 500-foot stable approach call. I was also unsure about slowing to V_{REF}, but as the student in this situation, I was prepared to learn.

The sight picture from the large cockpit windshield made tracking the 7,003-foot runway’s touchdown zone easy. Just as predicted, at 2 nm the bugged speed reduced from 140 knots lower but not all the way down to our V_{REF} of 120 knots. As before when slowing to 140 knots, the aircraft's pitch changed slightly and we settled at V_{REF} plus about five knots by about the time we got to minimums.

After Captain Pitcher's "Minimums" call, I hit the TO/GA button on the left throttle and both throttles advanced to go around thrust. The autopilot automatically disengaged and I rotated into the command bars and followed the navigation cues selected to match our climb out instructions. We cleaned up the airplane and steered back to KICT for one more approach and landing, this time fully hand flown.

Pitcher quickly downloaded the ATIS and programmed the landing data into the FMS, leaving us with time for more of my questions about approach speeds. I noticed on our first approach speed never made it to V_{REF}. Pitcher explained that the FMS uses inputs from the Air Data System as well as acceleration and deceleration inputs from the IRUs to come up with an adjustment, similar to the one-half steady and full gust factor used on other aircraft. He also said that we didn't want to land hot, because even with an extra five knots, the airplane likes to float. I asked if the airplane can simply be flown onto the runway in that situation and he readily agreed.

We received vectors to shoot the ILS Runway 01 Right and configured as before, extending the first notch of flaps about five miles short of glide slope intercept. With Flaps 1 and 2, pitch changes were minor and the aircraft slowed to target speeds easily. I did not feel any need for excessive pitch or trim changes with gear extension and capturing and maintaining the glide path was not a problem. The winds were called at 320-degrees, 16 knots gusting to 20, about a 12-knot crosswind without the gust.

I asked for full flaps right after glide slope intercept and again noticed the large pitch change, which I countered with aft yoke pressure. I trimmed and trimmed some more before Pitcher called me "a dot low." With a little more effort, I got us back on glide path and trimmed for 140 knots. Our V_{REF} was 118 knots and V_{APP} was 130 knots, but I was unsure what additive the airplane would choose once we were inside of 2 nm. Most aircraft that I have been typed in use half the steady state wind and all of the gust, with a minimum of 5 knots and a maximum of 20 knots V_{REF} additive. That would come to 12 knots above V_{REF}, or 130 knots.

"Here comes the speed," Pitcher called at 2 nm. The airspeed reduced quickly to about 125 knots. The trim change was noticeable but manageable and the autothrottles did a good job at keeping us on speed. I crossed the end of the runway at about 50 feet and found myself ready to flare at 20 feet, just as the autothrottles retarded to idle. I gave the right rudder a little push to align the aircraft with the runway and my hands subconsciously leveled the wings. Rotating to the flare attitude required minimal force and the wheels kissed the runway right at the 1,000-foot fixed distance markers, proving once again that trailing link main landing gear make pilots look better than they are.

As soon as the main gear weight on wheels system signified the aircraft was on the ground, the six panels of the ground spoiler system fully deployed, making the aircraft settle nicely as I slowly released back pressure. The automatic ground spoilers use throttle lever angle, weight on wheels, and airspeed to trigger deploy and stow actions.

I lifted the thrust reverser levers to the reverse position and slid both throttles to full reverse. "Keep them there," Pitcher reminded me. The FADEC automatically began to reduce the amount of reverse thrust at 85 knots, ending at idle by 45 knots. This allowed me to keep the levers at full reverse, not having to worry about any engine or aerodynamic limitations while maximizing the stopping force. At 30 knots, the ground spoilers automatically stowed.

Taxiing back to where we started, I was again hit by the simplicity of it all. Many mundane pilot tasks are automated, and many tedious tasks are simplified. This was further emphasized during shutdown, which was simply a matter of shutting the engines down and turning off the batteries. "Gear pins?" I asked. "Not needed," I was told. The gear down locks require hydraulic pressure to release, removing yet another pilot worry.

As I walked away from the aircraft, I remembered a caution during my last aircraft initial training, in the Gulfstream GVII: "You have to get through the complexity to get to the simplicity." For pilots, simplicity promotes safety. I think that perhaps for the Citation Longitude, the mantra should be: "You have to embrace the simplicity to maximize the safety."