The Alpine upgrade is a way for CJ2+ owners to get the technology and features of a new Citation M2.

If it isn’t blindingly obvious already that Cessna has made a huge shift to Garmin avionics in its lineup of business jets, then the addition of the G3000 flight deck to the Citation CJ2+ is yet another indicator of where the company is headed. The G3000 upgrade for the CJ2+ is part of a new package, called the Alpine edition, that is not an option for new jets coming off the assembly line in Wichita but is available only as a retrofit. Cessna has also switched the CJ3 to the G3000 system in the new CJ3+, but this is for new jets, not retrofits.

The Alpine (and the CJ3+) include not only the G3000 avionics—replacing a Rockwell Collins Pro Line 21 system—but also upgrades to the environmental and pressurization control systems and changes to other supporting systems. Optional avionics features, cabin interior packages, the Clairity cabin management system and fresh paint are also available. Basically, the Alpine upgrade is a way for CJ2+ owners to get the technology and features of a new Citation M2.
Cessna’s recently certified M2 is actually a CJ1+ that was modified with the same systems and avionics as the Alpine CJ2+, according to Matt Wild, Cessna program manager for customer service. The Alpine CJ2+ program was launched in 2010 at the same time as the M2, and the airplanes share the same avionics and systems. First flight of the Alpine CJ2+ was June 13, 2013. Wild wouldn’t comment about plans to offer the Alpine version of the CJ2+ as a new airplane—say an M3—but it would be surprising if this wasn’t on Cessna’s drawing board. “At this time we’re focused on the aftermarket,” Wild said.

In addition to the G3000 flight deck, the Alpine CJ2+ is now equipped with a fully integrated temperature control system. Any problems that pilots had with the original system stemmed not from its capabilities but from its controls, Wild explained. “Now it’s less complicated.”

**Touchscreen Talents**

Two Garmin GTC 570 touchscreen controllers replace the Pro Line 21 FMS and lots of knobs and switches in the pedestal, and the pedestal itself is seven inches shorter, which makes getting into the pilot seats much easier. The only difference between the G3000 and the G5000 system that is in the Sovereign+, the new Citation X and the upcoming Longitude and Latitude is the number of touchscreen controllers. “The software is identical,” he said. One feature that differs between the G3000 and G5000 is that Tcas I is standard on the Alpine’s G3000, but it can be upgraded to Tcas II with Change 7.1.

The redesign of the cockpit that accompanied the switch to the G3000 suite deserves notice, not just because there are 50 percent fewer knobs and buttons or because Garmin’s 14-inch displays in landscape orientation deliver a lot more screen real estate but because of the big change brought about by the touchscreen controllers. The controllers are the heart of the flight deck; almost everything can be controlled with the touchscreens, and pilots don’t have to fiddle with obscure menus and multiple knob-turns to plan flights, switch frequencies, set up Vnav profiles and so on.

But control of avionics isn’t the sole benefit of the touchscreens. Cessna engineers clearly saw that new pilot-friendly functions can be added simply by using the touchscreen to replace cockpit controls. The new environmental system controls are an excellent example of putting this philosophy to work. Instead of switches, knobs and sliders that can wear out and must be mounted somewhere and hooked up to wires, the system can be manipulated by controls designed into the touchscreen and hooked directly to system busses. The photo illustrates this, showing interior temperature and air distribution controlled with simple touchscreen sliders and touchable buttons replacing switch functions.

The touchscreens also control the new digital pressurization control system, and oxygen pressure is now displayed on the MFD, which eliminates another panel gauge. Some engine controls have also been moved into the digital space, including Fadec channel reset and select switches and ignitor switches and indicators.
Other added features include Cessna’s Aircraft Recording System (Ares II), a maintenance diagnostic system with wireless access, and Garmin’s CDMS diagnostic and maintenance system, which can transmit fault information via the optional Garmin GSR 56 Iridium communications system.

The electrical system is also entirely new, with new wire bundles built to serve all optional equipment, and new electrical junction boxes fitted with circuit breakers needed for the options.

Other reasons that owners might consider upgrading their CJ2+s to the Alpine edition, Wild explained, are that it provides a simpler way to add modern avionics options. Waas GPS is standard with G3000, which is not unusual, but some not-so-old jets face an expensive upgrade path for Waas. The same is true for ADS-B out, which is also standard with the Alpine upgrade. Garmin’s digital GWX 70 radar, which replaces the magnetron with a more reliable solid-state transmitter, is another standard feature. Sirius XM WX is included, as are Taws B and Garmin’s ChartView approach charts and SafeTaxi airport maps. Also standard is an L-3 Avionics ESI-1000 Trilogy wide-screen electronic standby instrument, which can run for two hours on backup power. ADS-B in will be a software upgrade, and Cessna anticipates being able to offer enhanced vision as a future option.

Another benefit of the upgrade is that the crew advisory system is fully integrated, according to Wild. Customers have also been asking for the ability to leave avionics on during engine start, so now an auxiliary battery (16-amp-hour lead-acid) in the Alpine’s nose powers avionics on the ground and during starts and provides backup emergency power.

**Upgrade Costs**

The Alpine cockpit and systems upgrades will cost $900,000, and Cessna expects to receive FAA supplemental type certification in the second quarter, followed by EASA certification. The upgrade, which strips the cabin and cockpit down to the metal structure, takes 10 weeks and will be available at Cessna Citation service centers, initially the U.S. facilities. While the G3000 avionics and the systems upgrades shave about 50 pounds off the CJ2+’s empty weight, some of that may get added, depending on the options the owner picks.

Other avionics options include Taws A, synthetic vision with integrated Taws alerts, Doppler/turbulence radar display, wind-shear detection and alerting, SurfaceWatch audio taxiway/runway alerts, HF radio, Link 2000+ controller pilot datalink (for European operators), Stormscope and Garmin’s GSR 56 Iridium satphone.

The cockpit upgrade isn’t just avionics and electrics, but also includes new pilot seats, new control wheels with leather-covered yokes, storage pockets and trays, USB charging ports with auxiliary audio input, a new swept glareshield and redesigned circuit breaker panels.

Cabin options include the M2’s wireless Clairity cabin management system (based on the Heads Up Technologies fiber-optic backbone), a cabin intercom system and four Alpine interior choices with retailored seats. Cessna is also offering Alpine edition paint schemes.
Alpine Adventure

Unlike most pilot report flights, which usually involve flying around to do air work and performance checks, my flight in the CJ2+ Alpine edition was a good real-world test of the jet’s cross-country capabilities. Engineering test pilot Corey Eckhart and I flew N64LW from Mid-Continent Airport in Wichita to Hot Springs, Ark., on a cold and gusty January day.

The Alpine weighs about 7,800 pounds empty, and with about 1,900 pounds of fuel in each wing, two pilots and two passengers, we were near the maximum weight of 12,500 pounds. Total fuel capacity is 3,961 pounds, and the single-pilot-certified jet can carry up to seven passengers in standard configuration, or eight in an optional layout. The interior includes a club-four seating area, then two forward-facing seats and the lavatory area. The external baggage compartment in the aft fuselage is huge, with 50 cu ft of volume and up to 600 pounds of capacity. The 15-cu-ft nose compartment’s capacity is the same 400 pounds as the regular CJ2+’s, but there is actually a little extra room thanks to removal of some avionics boxes.

Eckhart was also one of the test pilots on the M2, which shares the CJ2+ Alpine’s G3000 cockpit. He has flown the Alpine for more than 120 hours and enjoys the new Garmin flight decks. “From a situational awareness and access point of view,” he said, “it’s extremely user friendly. It’s a nice refresh to the [cockpit], easier and more intuitive; 95 percent of pilots are familiar with Garmin products.” He especially likes the touchscreen controllers instead of the FMS keypads. “It walks you through it.”

The Williams International FJ44-3A-24 turbofans are Fadec-controlled and each delivers 2,490 pounds of thrust at sea level. Flying with Fadec is habit-forming; the simplicity of moving power levers to preset detents that deliver exactly the right power setting makes engine management so much easier, especially for a solo pilot. Starting with Fadec is simple, too: just push the start button, advance then retard the throttle to idle, then watch the engine gauges.

The G3000 has 60/40 split screens, and each pilot can configure the PFD as desired, with, for example, engine gauges on the top left, a chart on the bottom left and the flight instruments on the 60 percent window on the right. Normally the engine gauges sit on the left side of the MFD, along with systems information.

Some CJ2 pilots complain that the jet’s brakes are grabby, and they did seem fairly sensitive during the taxi, but a light touch kept jerking to a minimum. Lined up on Mid-Continent’s Runway 01R, I held the brakes and moved the power levers to the takeoff detent and the light jet accelerated quickly as Eckhart ran through the standard callouts. I lifted the nose off the ground, and the Alpine climbed rapidly and reached 155 ktas and 2,500 fpm at the end of the runway; after cleaning up and setting climb power, we leveled off briefly at 5,000 feet then accelerated to 250 ktas and continued climbing at a healthy clip, still more than 3,500 fpm as we passed 10,000 feet. Before reaching the FL180 transition level, I switched on the smooth Garmin autopilot and we climbed with only a couple of short ATC-
caused pauses to FL450, the jet’s maximum altitude. “You don’t have to step climb at all unless it’s ISA +15 degrees,” said Eckhart. Passing through FL400, the Alpine was still climbing at 1,200 fpm.

Time from takeoff to FL450 was about 26 minutes. The pressurization system, with a maximum differential of 8.9 psi, holds the cabin at sea level until about 23,500 feet, and on that day at maximum altitude it pressurized the cabin to 7,800 feet, although the brochure says 8,000 feet. We tested the Alpine’s Garmin GSR 56 Iridium transceiver, which receives Garmin’s Connext worldwide datalink weather data (when outside the area where Sirius XM WX works) and also can be used to send and receive text and voice messages. Text messages cost 50 cents each.

The G3000’s range rings on the center MFD showed us how far we could fly under these conditions, and it was interesting to see how the strong winds aloft squeeze and expand the rings, depending on which way we planned to fly. For rough averages, Eckhart budgets 960 pounds of fuel for the first hour and 370 nm, then 850 pph over 400 nm for subsequent hours. Maximum range with NBAA 100-nm alternate is 1,613 nm.

After a short break at Hot Springs, we took off and headed back to Wichita at FL430, this time fighting strong headwinds. Cruise speed settled down at the max cruise of 418 ktas, burning 380 pph per engine at ISA +5 degrees C. The climb to FL430 took just 22 minutes.

We descended back toward Wichita and a comfortable landing in the gusty winds. The straight-winged CJ2+ is a straightforward jet, and the G3000 cockpit makes it even simpler and more friendly to fly. While the Garmin avionics might seem complicated at first glance, the touchscreen controllers are a big step up from the button and knob-controlled G1000 system installed in Cessna’s Mustang but also a welcome environment for any pilot who is used to less capable and more complex flight decks.