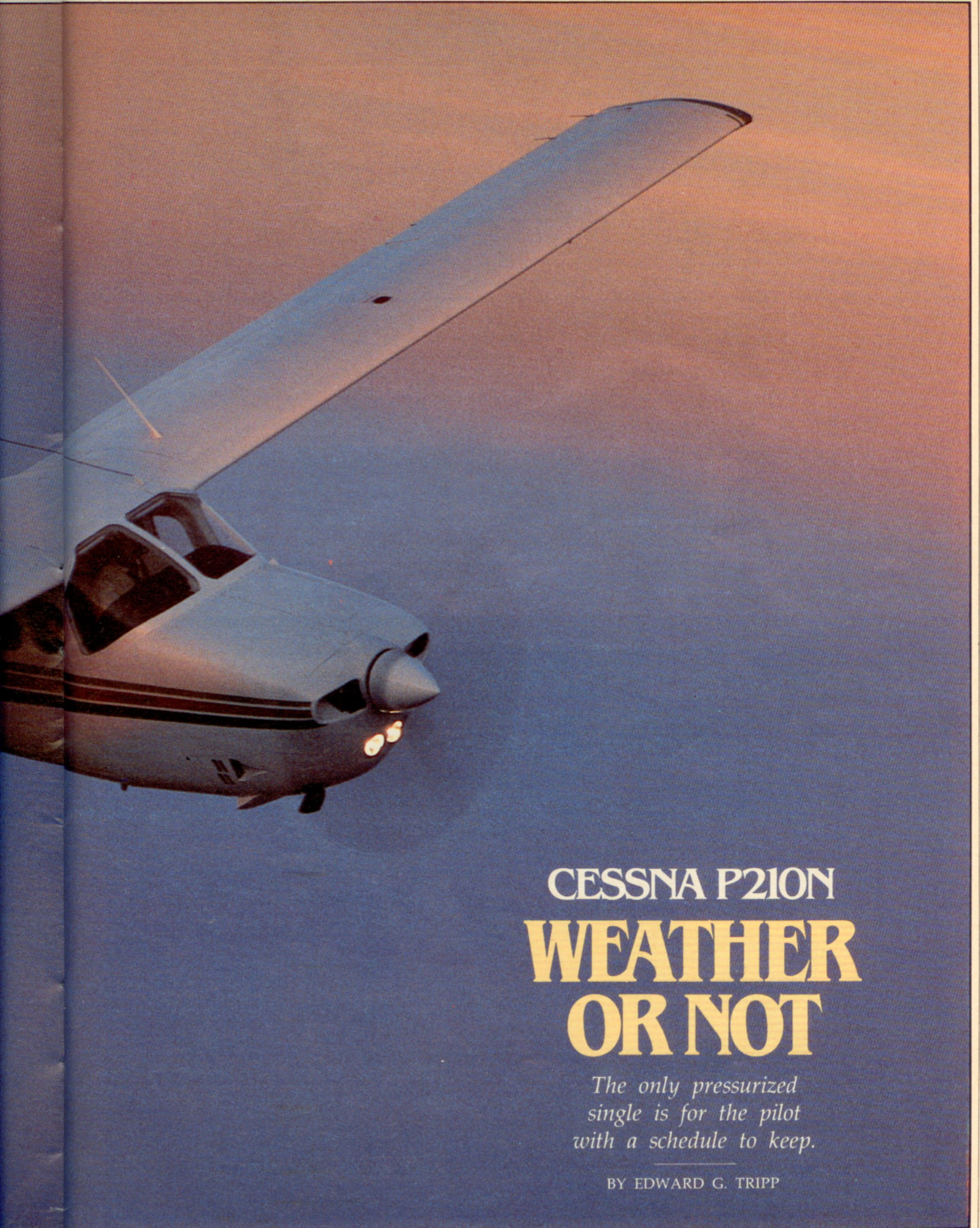


CESSNA P210N

WEATHER OR NOT

The only pressurized single is for the pilot with a schedule to keep.

BY EDWARD G. TRIPP

CESSNA P210N

We sat on the ramp in the heavy rain and sharp gusts, with just the sliding pilot side window open for ventilation. The weather was too severe even to remove the tie-down ropes. Clearance delays were extensive.

By the time our clearance was issued and the enormous cell and the dynamite blasts of lightning had passed to the east, it was nearly dark.

The airplane struggled up through the heavy haze, the turbulence and the moist, 100°F heat. Max continuous power resulted in an 800-fpm climb—the best we could do, we explained to Center when asked for an expedited climb to 10,000 feet.

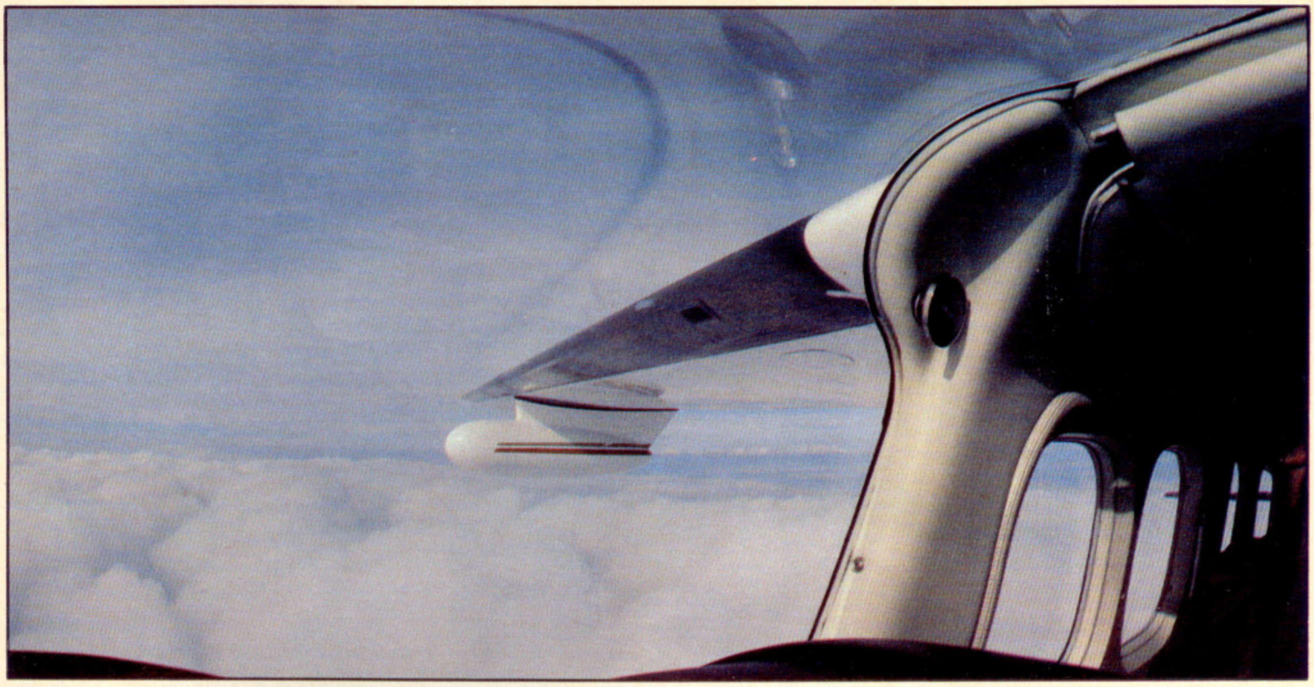
Bright flashes popped on three sides almost continuously. I scanned the radar with concern, periodically adjusting the tilt and gain controls because there was no return. Obviously, there was a lot going on out there.

By 6,000 feet we were above a scattered deck and out of the haze. Rounding a small cu, the moon and two companion stars appeared. A huge cloud mass just to the north extended at least 60 miles; another busy set of cells was glowing and flashing regularly to the south. It was hard to tell what were strobe flashes and what were lightning flashes, as we ducked in and out of wisps of stratus.

At 16,000 feet the air was clear and smooth. The light show was more enjoyable now, with crisp flashes of cloud-to-cloud and cloud-to-ground bolts, punctuated with muffled, colorful fireballs in the many active cells.

For more than an hour to the north and to the south, it was as though the gods were conducting a fierce artillery duel in the sky. Fun to watch, even more fun to be 40 miles away.

The last light of the sun had receded. The moon increased in intensity, and the family of stars grew with the deepening cobalt of the sky. Muffled flashes apeared again, this time to the west; but there was no indi-



cation on the scope with the radar set to its maximum (160-mile) range. The destination, however, was just beyond the 160-mile marker.

The flashes became sharper and cumulus clouds began to loom black against the now nearly black sky. We hit a lump every now and then. Clouds reached up like frustrated fingers, not quite high enough to touch us. We began to run in and out of stratus again, and a bit of rime collected on the windshield and the airframe each time we did.

Cabin altitude was 7,200 feet. A touch of heat felt good in the (relatively) warm 0°C outside air temperature. Night. Alone in the sky, it seemed. Single-engine IFR with thunderstorms from the Atlantic to the middle west and intermittent icing. Yet I was comfortable. Everything was working, and I laughed at myself for looking up at the moon and *almost* saying out loud, "All systems go."

The very active cell to the west was defined more clearly—and big. From the reflected light, I could see a higher, overcast layer. The airplane began to bounce more frequently.

The cell sat with its northern tip right over Dayton, the destination. It was contouring on the radar now, and it was a cell to be treated with intense respect. Behind it, two more were developing. Judging by the movement, if the first had passed Dayton when we arrived, the second would be right there with us. And then there was the third. One of

Pressurization and radar add flexibility, safety and high-altitude capability.

them surely would be waiting. ATC agreed and said there were several aircraft holding 40 miles to the south. Would we care to join them? Indeed, thank you. We headed south.

Two 727s and a Convair were in the stack. Even they did not want to tangle with the intense storms.

One cell did go directly over our destination airport in Dayton. When we shot the approach several minutes later, there were nearly two inches of water standing on the runway.

It was a routine flight, in a way, although it was a very interesting one. It also was an interesting demonstration of the capabilities of the Cessna P210. Just one of a series of odysseys that stretched over two months, 110 flight hours and a variety of missions flown in two different P210s, it helped to satisfy our curiosity about the characteristics and the practicality of the only pressurized single-engine aircraft on the market.

The concept of a pressurized single is, to us, the logical end product of piston singles as transportation. As far as the ultimate is concerned, that will have to wait until there is a turbine engine available to mate to an airframe, plus systems that will make both operational and economic sense.

Speed, good useful load, range, high-altitude capability and efficiency, weather detection and weather protection, some systems redundancy, comfort and operational flexibility with *relative* economy—all are available in the Cessna P210N.

The idea is not new, and the P210 is not the first product. Mooney was the first to try with the Mark 22 Mustang in the middle 1960s. It was an interesting attempt that failed, not so much because of the design as from unrealistic management and poor cost and time projection.

There was a single-engine turboprop, too. The Interceptor, a derivation of the Meyers/Aero Commander 200, went through at least two cor-

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porate reorganizations before it retired into the history books.

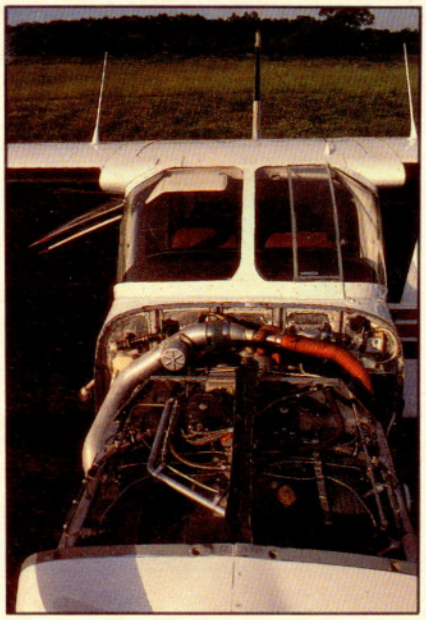
At the end of the 1960s, Del Roskam, who then was president of Cessna, stated that it was only a matter of time before we would be flying pressurized singles.

The technology was not really all that difficult. There were no new engineering or materials advances required; all the necessary equipment and techniques had been proven.

Cessna is credited with proving or developing the necessary first step, turbosupercharging, and with sticking with it when other airframe manufacturers backed off because it was too troublesome and expensive.

When the pressurized Skymaster was introduced in 1971, quite a few pilots thought a pressurized 210 would follow fairly soon. There were a lot of similarities between the two, particularly in the fuselage.

By then the 210 had evolved considerably from the original version of 1959. It already was considered a



Continental TSIO-520-P is the power that takes the P210 to 23,000 feet.

good combination of performance, load carrying and loading flexibility. The T210 had been introduced in 1967, so operational experience and development had been taking place, in effect, too.

It was not until late 1977, however, that the pressurized single made it to the market (see "Cessna's Pressurized Centurion," p. 38, *AOPA Pilot*, June 1978). It did not represent new technology or equipment. The engine/turbo system had been well proven. It is, however, a fairly successful marriage or agglomeration of what existed and a concept: all-weather, high-altitude, single-engine flight.

The P210 has been accepted readily, too, with nearly 600 units delivered in its two-year production span.

On the other hand, there have been quite a few operational problems, which appear to be a combination of design deficiencies and manufacturing, installation and quality-control concerns. In addition, these have been compounded by operator diffi-

culties and service shortcomings.

Most of the problems have been related to the powerplant and the fuel system; others have to do with electrical and add-on systems.

What is important is that the difficulties are not the result of pushing a frontier. Although some still may consider pressurized single-engine flight a frontier, it really is one only for the pilot who is not sufficiently knowledgeable or experienced for high-altitude flight. That ground can be covered with the help of training.

We will discuss the P210's problems and some equipment and operational considerations in a later issue.

Comfort, speed and flexibility cost money, and the P210 is premium-priced. The price differential between a normally aspirated and a turbocharged 210 is $7,720. The difference between a T210 and a P210 is $34,000 (approximately twice the price differential between the short-lived, unpressurized 335 and the 340).

What that buys is pressurization. In every other respect the T210 and the P210 can be outfitted identically, including the known-icing option. The T210 is approved for operation 4,000 feet higher than the P210. (This difference is caused by the altitude at which the P210's 3.35 pounds-per-square-inch differential can maintain a cabin altitude below the altitude at which oxygen is required. Cabin altitude at 23,000 feet is 12,100.) The T210's maximum speed at 20,000 feet is only four knots slower, and its useful load is 119 pounds higher.

The external and, surprisingly, the internal dimensions of the two aircraft are identical. The T has a 40-pound-higher baggage capacity, but the P has a baggage bay that is 14 inches longer.

Is the P210 worth another $34,000? If you fly a lot and have schedules to keep, once you have flown a pressurized airplane, the answer will be yes. Noise level is lower. The noisiest part of a P210 from the cabin is (no, not the clock) the avionics cooling fan. And noise is a large factor in fatigue. So are the physiological factors, such as reduced oxygen, as slow as 10,000 feet. The difference in fatigue levels after a long flight is remarkable.

The P210 makes pressurization available for less money and lower operating costs than does anything else at the moment. Since anything else has two engines, operating, as well as initial, cost is even higher.

We think Cessna certainly has proven the value of pressurization for single and twin piston-powered aircraft. There will be competition for the P210 eventually. Mooney already is cutting metal for the prototype of its design, the M30 (Pilot News, p. 17, August *Pilot*). Beech certainly has the capability to develop a pressurized single, if it decides the market is worth entering; and it has the A36TC Bonanza and a very similar vessel in the 58P Baron.

But for now, where operational flexibility is concerned, Cessna has the ultimate single.

The P210 is easy to recognize. Its appearance is tank-like, with all the little windows that run down the fuselage and over the back. The cowl fairly bristles with louvers and scoops and looks almost too heavy for the tubular main gear.

The windshield is two piece, with a fat center post and wider side posts.

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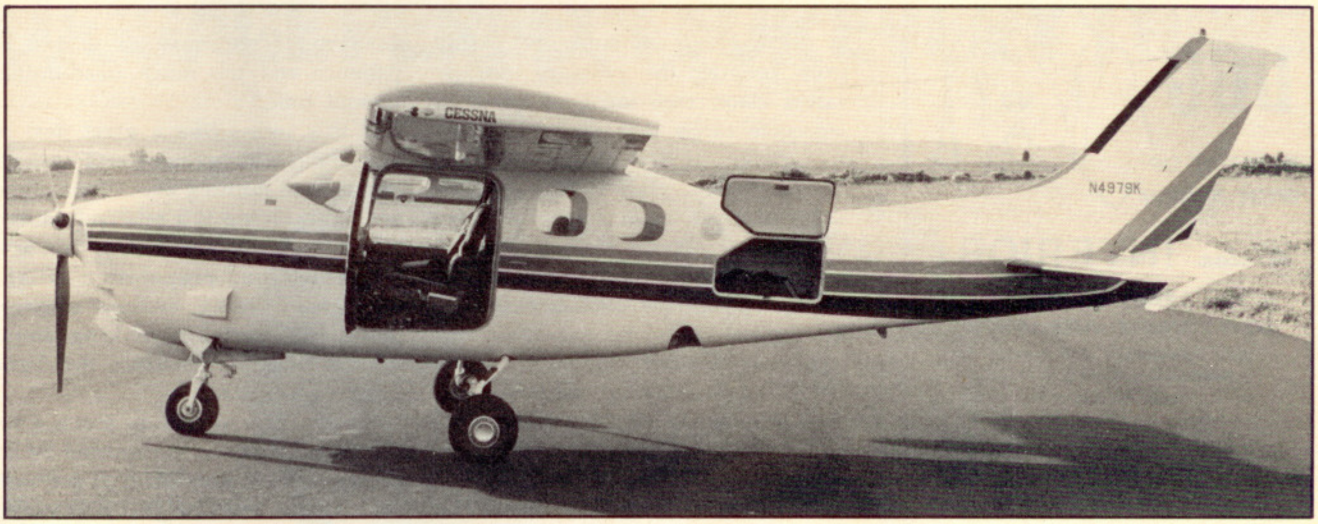


The small windows and thick supports create the impression from the cockpit that the P210 is smaller than the 210, but that is strictly an illusion. With the radar pod hanging from the right wing like a military store, visibility on the ground and in flight is restricted further.

Ground maneuvering has to be carefully planned, because the pod restricts visibility to side and about 45 degrees forward. In flight, there is a great deal of bending, stretching, wing rocking and general unease when traffic is called at three o'clock. But the inconvenience and the added care the radar requires is well worth it, because of the operational flexibility and safety it can provide.

There are no aspects of preflight that are unusual or different, particularly for someone used to the larger Cessna singles. Unless you are more than seven feet tall, there is one piece of equipment you will need that does not come with the airplane: a small step stool or ladder to check fuel levels. (It is too simple for a lineman to under fill it and to leave the caps loose.) It also is important to make sure that things mashed under the rear seat or in front of the screen at the forward baggage-bay bulkhead do not block the pressure outflow valves.

The other aspect of the P210 that is not standard-Cessna-single is the door arrangement. There is only one, and it is on the pilot's side. It is a solid hunk with nine locking pins to secure it to the pressure vessel when the large lever is closed. There is an openable window that slides back on a track for better ground cooling. A large top-hinged window/emergency exit on the right side is useful for ventilation on the ground. It is locked by rotating a large D-ring handle to engage the locking pins.

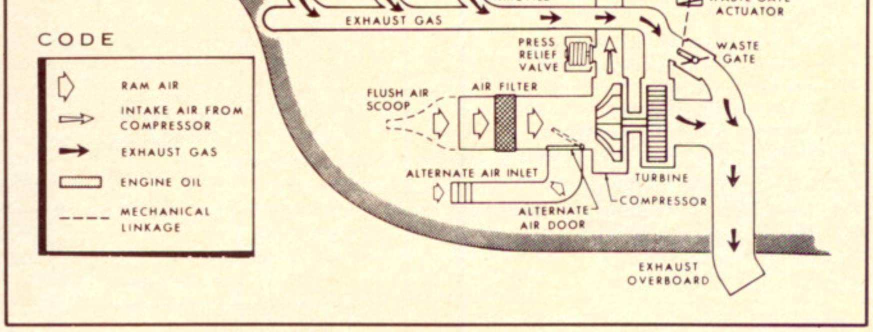
There's only one door— on the pilot's side. The right side has only a window that opens.

Loading the cabin requires some planning. The pilot's seat track has been extended on newer models to make access to the right front seat easier. This seat should be filled first.

Access to the fifth and the sixth seats is awkward; and when the cabin is fully loaded, it takes a bit of negotiation and seat adjustment to make everyone as comfortable as possible.

The P210 should be considered a four-plus-two, actually, since anyone more than five and half feet tall will be uncomfortable in the rear. Cessna has carried its rear-window tradition into the P210, but the only value is to provide an additional inch or two of headroom.

A bit of rear-seat and baggage-bay space is lost to avionics equipment, mounted under the seat, and the pressure outflow valves. Even so, the baggage bay still is large, even when the optional air conditioning system is installed (the condenser is mounted



The P210N's pilot operating handbook illustration shows how the turbocharger system works, tracing the path of induction air through the engine, then out in the form of exhaust gas.

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in the baggage compartment). Aside from keeping the pressure outflow valves clear, care must be taken to segregate cargo that might burst or spill during high-altitude, unpressurized flight and place it in the cabin.

The cockpit arrangement and the location of instruments and systems controls is quite good, even when a full load of options, such as radar, de-ice systems, stand-by generator and stereo, is included.

The environmental controls are somewhat scattered. The cabin altitude pressure differential and cabin rate-of-climb indicators are on the lower-left instrument panel; the dump valve control is to the extreme left of the lower subpanel; the pressurization switch and the cabin altitude selector are below the left control wheel; the heating, defrosting and cabin-air controls are over on the right subpanel; and the fan and other controls are in the overhead.

The engine instruments are a bit more scattered than we would like, too; and precise power and mixture adjustments require a great deal of patience and too much head-in-the-cockpit time.

If this seems like a great deal of talk about arrangement and systems and next to nothing about flying, you are right. Flying is a relatively minor aspect of an airplane such as this. System selection, preparation, flight planning, training, systems management and decision making about other things overwhelm the basic function of flying.

The P210 is almost as much a set of systems that are transported by air as is a turbine aircraft. It is a check-list airplane and one that is operated by a manager. What it can do and how well it does it are more important than how it flies. Operational considerations and flight planning are key. The decisions you make before you buy it and fly it will affect greatly the flying you do in it.

It also is a set of compromises to achieve a capability. We will go into how well it has succeeded and how it flies in a future issue. □

Cessna P210N Pressurized Centurion
Basic price $117,300
Price as tested $183,000 (N4979K)

Specifications	
Engine Teledyne Continental TSIO-520-P, 285 hp @ 2,600 rpm (max continuous power) 310 hp @ 2,700 rpm (max power—5 min takeoff)	
Recommended TBO	1,400 hr
Propeller McCauley, constant speed, 80 in	
Wingspan	36 ft 9 in
Length	28 ft 2 in
Height	9 ft 8 in
Wing area	175 sq ft
Wing loading	22.95 lb/sq ft
Power loading	12.95 lb/hp
Passengers and crew	6
Cabin length	8 ft 11 in
Cabin width	3 ft 6 in
Cabin height	4 ft
Empty weight	2,340 lb
Equipped empty weight	2,632.5 lb
Useful load (basic aircraft)	1,676 lb
Useful load (as tested)	1,383.5 lb
Payload w/full fuel (basic aircraft)	1,142 lb
Payload w/full fuel (as tested)	849.5 lb
Max ramp weight	4,016 lb
Max takeoff weight	4,000 lb
Fuel capacity (standard)	90 gal (89 usable)
Oil capacity	11 qt
Baggage capacity	200 lb
Performance	
Takeoff distance (ground roll)	1,300 ft
Takeoff over 50 ft	2,160 ft
Rate of climb (gross weight)	930 fpm
Max level speed (sea level)	180 kt (est)
Max level speed (17,000 ft)	206 kt
Cruise speed (80% power, 10,000 ft)	182 kt
(80% power, 20,000 ft)	195 kt
Cruise speed (70% power, 10,000 ft)	169 kt
(70% power, 20,000 ft)	184 kt
Cruise speed (60% power, 10,000 ft)	156 kt
(60% power, 20,000 ft)	168 kt
Range at 80% cruise	
(with 45-min reserve) 10,000 ft	680 nm
(with 45-min reserve) 20,000 ft	705 nm
Range at 70% cruise	
(with 45-min reserve) 10,000 ft	780 nm
(with 45-min reserve) 20,000 ft	805 nm
Range at 60% cruise	
(with 45-min reserve) 10,000 ft	925 nm
(with 45-min reserve) 20,000 ft	910 nm
Max operating altitude	23,000 ft
Critical altitude	17,000 ft
Landing distance (ground roll)	765 ft
Landing over 50 ft	1,500 ft
Limiting and Recommended Airspeeds	
Vsi (Stall speed clean)	67 kt
Vso (Stall speed with full flaps)	58 kt
Vne (Never exceed)	200 kt
Vno (Max structural cruise)	167 kt
Va (Design maneuvering)	130 kt
Vfe (Max flap-extended) To 10°	160 kt
10° to 30°	115 kt
Vlo (Max landing-gear-operating)	165 kt
Vle (Max landing-gear-extended)	200 kt
Vy (Best rate-of-climb)	100 kt
Vx (Best angle-of-climb)	78 kt