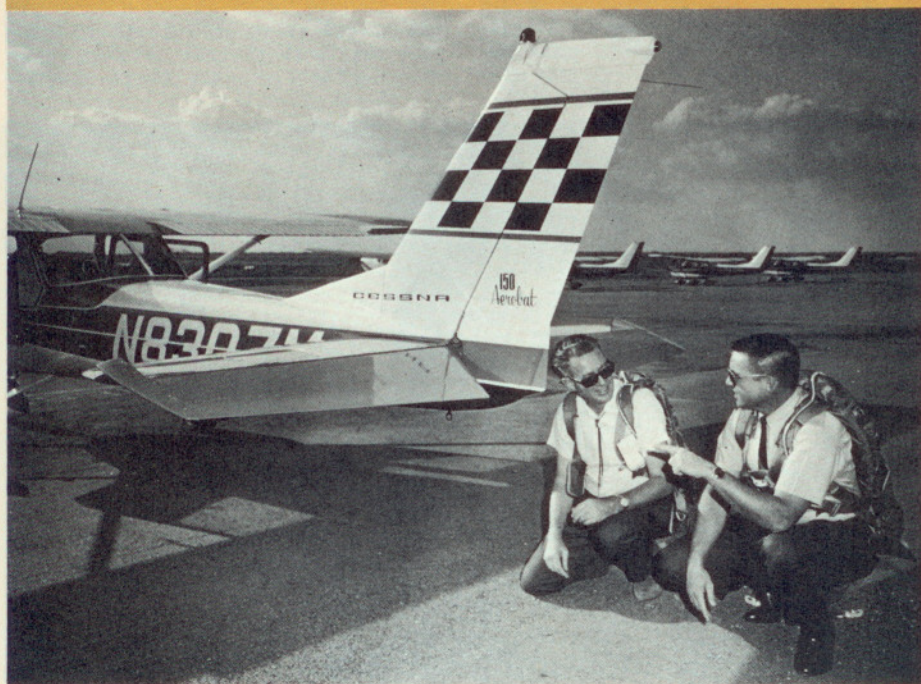


# When Flying The AEROBAT

by DON DOWNIE / AOPA 188441



Author Downie (left) and Cessna pilot Chuck Hinson talk things over before going up in the new Cessna 150 Aerobat.

■ ■ More words have been expended on the 16 pounds of added structure ("beef-up") of Cessna's new *Aerobat* than on anything to get off the ground in quite some time. The year-long project to develop a 150 with aerobatic capability took some 8,000 engineering hours and another 7,000 hours of fabrication time, so this is no "quick and dirty" re-do.

These 16 pounds of added "beef" went into stringers, doublers, thicker skins in critical areas, added rivets, and a number of minor changes to produce a trainer certified for plus six and minus three Gs, with an added 50% "fudge factor."

You might have difficulty in distinguishing the *Aerobat* from any other 150 if it weren't for the gaudy paint job. There's a checkerboard tail and top cowling, a diagonal stripe midway out the wing, and a brightly colored horizontal tail. This paint job is straight from Barnum and Bailey, and, man, it's loud! All this window-dressing is fine except that the checkerboard on the top of the cowling produced some windshield reflections when flying into the sun.

Just to set the ground rules, it is this reporter's opinion that the new *Aerobat* has three important things going for it.

The newest 150 can expose students to spin recoveries, teach them how to roll off their backs from wake (or other) turbulence, and do the job in the conventional side-by-side cockpit that most pilots will probably be flying in, if and when these unusual positions occur.

Again, from a personal standpoint, I found aerobatics in a side-by-side, wheel-controlled airplane to be a new and not entirely satisfactory experience. It's more difficult at first to perform precision aerobatics side by side, because you're not sitting on the centerline of your maneuvers. However, I'm sure that a few hours of practice would take care of most of this problem. After teaching primary aerobatics to 25 USAAF cadets

(bless 'em all) in Stearmans many years ago, the transition to rolling around with a control wheel rather than a stick was predictably different.

My approach to the new *Aerobat* was admittedly with a pinch of suspicion. It wasn't helped any when demonstration pilot Chuck Hinson, head of Cessna's transportation department, went back to his desk to pick up a couple of "sick sacks"—"just in case," he commented. I didn't argue, since *Aerobat* No. 7, N8307M, still had that brand-new-airplane smell. However, I think that a supply of mal d'aire containers carried unobtrusively in the glove compartment would take care of embarrassment without special prebriefing.

Hinson weighs 215 pounds. I weigh 180. Two backpacks approach 20 pounds each. My Mamiya 23 camera with wide-angle lens and strobe weighed less than five pounds. The fuel gauges showed somewhat less than full, so we were at full gross weight of 1,020 pounds; 580 pounds useful. Cessna is getting a break in the weight department when comely Joyce Case, former women's aerobatic champion (who weighs perhaps 100 pounds, according to Hinson) does the demonstrations.

Our walk-around disclosed an optional step midway up the wing strut to aid in fueling and checking fuel caps. We found later that this handy step was checked out for strength by the weight of a 265-pound gas man.

The adjustable bucket seats have over five inches of fore and aft adjustment. Both went to the aft stops for Hinson and me. Seat and back cushions are removable, depending upon what type parachute you're using. We had backpacks, so the regular back cushions were stowed securely behind the seats.

You need Cessna's yard-wide door to get in and out of the cabin with a chute on. There was sufficient room inside for the factory pilot and me, but not much to spare, since we're both taller than average. Shoulder harnesses come all the way from the back of the baggage compartment and loop under a standard military-type quick-release buckle.

The *Aerobat* has a red "D" ring "panic handle" that will pull the pins on the door in emergency. Since the hinge line of the door is forward of the wing strut, the published emergency procedure recommends unlatching the door before pulling the emergency handle. During an actual bail-out situation, I rather doubt that everyone would follow this two-step procedure. The factory has not jettisoned a door in flight, so no one is really sure whether or not there

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*Downie finds 'side-by-side' aerobatics disconcerting, but believes Cessna's new 150 has place in training flyers to cope with unusual attitudes which may be encountered in flight*

would be a hang-up.

We climbed aboard, wrestled the belts snug-to-tight, and made sure that we could still reach all essential controls. It was chummy. Takeoff and climb were not spectacular, since Cessna has retained the dependable 100 h.p. Continental powerplant to keep the cost down to \$10,495. The standard 150 costs \$8,350; the *Trainer*, with dual controls, radio and other essential goodies, is \$10,225; and the full-house *Commuter*, with gyros, wheel fairings, wall-to-wall carpeting, optional long-range tanks, and "full house" avionics, lists at \$11,450.

During our leisurely climbout, we decided that Hinson would demonstrate a maneuver while I photographed from inside the cockpit. Then I'd attempt the same maneuver while he did the photography. Cessna has almost all of Kansas for a practice area, and we headed east, off airways south of Augusta. Sufficient airspace for aerobatic practice will be a problem in some high density areas.

Hinson explained that most factory-based aircraft fly with their altimeters set at zero. However, I had cranked in the field elevation of 1,384 feet to give an accurate indication of performance and speeds. So, when you see 5,000 feet on the altimeter in the cockpit photos, we were actually only about 3,600 feet above the ground.

There's a list of entry speeds posted on the ceiling between the new overhead skylights. These two top openings are a distinct aid to both general visibility and attitude reference when you're somewhere other than right-side-up.

We leveled off at 5,500 feet, and Hinson asked what we'd like to try first. I suggested a snap roll, since it's quick and gives a good indication of what to expect in other maneuvers. Hinson made two clearing turns, I nodded, and he pulled the nose up briskly. As the airspeed dropped through 90 m.p.h., he applied brisk full-back wheel and full left rudder. No. 7 *Aerobat* pinwheeled around smartly, and we came out right on the horizon. I noticed that the factory pilot had used aileron against the snap during his recovery, and I questioned him about it.

"That's the way I was taught," he explained. The operations manual states that "aileron control can be used to provide more precise recoveries." However, no mention is made of the use of aileron in spin recoveries—and a spin is nothing more than a snap roll going straight down. Factory sequence photos of the *Aerobat* during a snap roll indicate aileron into the roll during entry and against the roll on recovery.

I handed the camera and strobe light to Hinson and tried it myself. Habits are hard to change, and I snapped the *Aerobat* just as I would a Stearman—without aileron. The roll was satisfactory, and recovery was within perhaps 10° of level.

Next we tried barrel rolls and aileron rolls. There must be a subtle difference between these two maneuvers, but I'm not really sure what it is. The *Aerobat*

barrel roll calls for a 45° turn during a 130 m.p.h. entry, while the aileron roll "is flown 'tighter' and accompanied by higher roll rates."

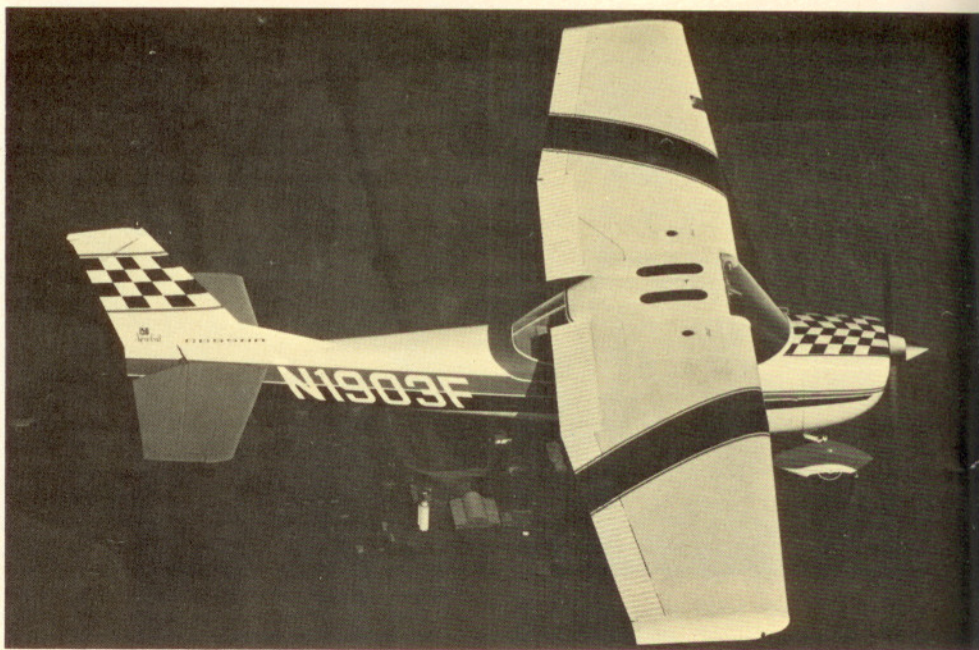
I fell out of my first roll by not maintaining full aileron all the way around. When you're unfamiliar with a control wheel for aerobatics, it's a bit of a problem to crank in full aileron as you keep coming back on the wheel to maintain positive Gs. However, a little practice should eliminate this pilot deficiency. Rolls are quite comfortable, and the snug shoulder-harness arrangement keeps people in their proper places.

The *Aerobat* is restricted from inverted flight, and here we'll quote the book: "Continuous inverted flight maneuvers are not approved because the gravity fuel system will not permit con-

his demonstration at the recent National Air Races in Reno by climbing to altitude, cutting the power, and then performing a power-off routine.

During our flight with Hinson, the only negative loads we pulled were purely inadvertent. I tried a half loop with a planned half snap roll at the top and goofed. The loop entry was too slow, and I ran out of speed long before reaching the inverted position, so the only way to avoid a tailslide was to apply full-back wheel and full rudder. We gyrated around in the sky for a while and eventually wound up in a conventional spin and quick recovery.

Fortunately, the *Aerobat* doesn't spin like an old Vultee BT-13, nor did it roll (for me) with the ease of a Stearman or an AT-6. The most reliable way for



View from above of a Cessna 150 *Aerobat* in flight.

tinuous engine operation in this negative G condition. In addition, the loss of oil pressure (with a windmilling propeller) and a loss of a quart or more of oil through the breather could be harmful to the engine."

Later, on the ground, I played "20 Questions" with William D. Thompson, Cessna's veteran manager of flight tests and aerodynamics. Thompson, a former USAAF primary flight instructor in Stearmans, has been with Cessna since 1947 and is an associate fellow of the Society of Experimental Test Pilots (SETP). [The writer is an associate member of SETP.—Ed.] Thompson explained that Federal Aviation Regulations (FAR Part 23) issued in February 1965 require that an aircraft fly inverted without engine sputtering. "If we'd 'beefed up' the older 120 or 140 model, certificated under older regulations, we wouldn't have this restriction. Actually, the only practical restriction to inverted flight is loss of oil pressure, and the 'goat's bag' dry sump in the engine will supply oil pressure for at least a minute and a half."

Former U.S. aerobatic champion Don Pittman evaded this technicality during

me to spin this checkerboard 150 was out of an accelerated stall. Bring the nose up briskly and, as the airspeed drops toward a stall, feed in full rudder and full-back wheel. Depending on your entry speed, she'll almost go over on her back before the weight of the engine drops the nose. The spin itself is straight down with power off, and rotation speed is not excessive. Precision recovery calls for full opposite rudder at no more than one-quarter of a turn before the recovery point. The *Aerobat* pops right out of a spin as soon as full-back elevator is released to neutral.

The book advises power off as soon as a spin is entered. "The use of engine power in the spin will tend to flatten the spinning attitude and prolong the recovery."

I tried to sneak into a spin with partial power by easing in full rudder with enough opposite aileron to keep the wings level. The speed slowed to a stall, but the 150 didn't spin. It just wallowed around as if trying to make up its mind and went back to flying again just as soon as the slightest aft elevator was

relaxed. Accidental spins in this bird, if it's loaded within limits, will be a most difficult maneuver.

Snap rolls and spins in a plane with the speed range of the *Aerobat* are non-violent, precise timing maneuvers that can be mastered quickly. The Immelmann and Cuban eight are only extensions of the loop and roll. Even more satisfying than the Cuban eight for me is a cloverleaf, a series of four loops over an intersection, with a quarter roll during the downward portion of the loop. This maneuver, however, eats up considerable altitude in a two-placer with only 100 h.p.

Everyone performs and teaches aerobatics just a bit differently. My own personal choice, after making two 90° turns to assure that I'm quite alone in the lonesome sky, is to make my dive to pick up speed in another 90° turn for an extra view of the area. Then square off on a road intersection—or what have you—and go to work. When you fail to do a maneuver properly, you can recheck with your reference line on the ground, when it finally reappears, and see how far off the mark you really were.

The *Aerobat* is a surprisingly good extension of a proven Cessna line. It should sell very well, since each large Cessna-equipped flight line should have at least one of these roll-around-in-the-sky models. To begin with, there will undoubtedly be a shortage of good aerobic instructors because these maneuvers haven't been on the curriculum for many years. Hinson advised me that the factory is recommending that each large flight school send one instructor to an approved aerobatic school and then have him come home to check out the other pilots. Some sales-oriented types may become a bit queasy while trying to make a sale, but that'll soon take care of itself.

The new *Aerobat* doesn't go back to the days of the biplane, oil-splattered helmet, and goggles and silk scarf, but it's sort of a step in that direction. There's an intangible sense of freedom to wander off into an unused chunk of sky and explore the soft corners of aerobatics. I've had most of the "hard aerobatics" knocked black and blue out of my system in Stearmans without shoulder harnesses. Yet I completely enjoy the easy pitch-off of a hammerhead stall when you've almost stopped going straight up, and you slowly, silently swap ends to pick up the same section line you started on.

The *Aerobat* had shown me what I wanted to find out. She'll spin and recover easily, she'll roll, she'll loop, and she'll recover from unusual attitudes. She'll help produce a new group of better pilots, better because they've been exposed to simple aerobatics. With the mystery (and fear) of these maneuvers eliminated, the *Aerobat* pilot can either tuck this experience in his memory bank and try to stay right-side-up or strap on the newest 150 from time to time and roll around for the sheer fun of it.

We were nearly out of usable altitude



Author Downie places *Aerobat* in a spin. The terrain you see through the windshield is almost straight down.



Barrel roll at the inverted point. Note gyro-horizon, aileron deflection, and plus one-quarter G force. IAS is 108 m.p.h., and the aircraft is still going up.

Cockpit photo by Chuck Hinson

This photo was taken by Chuck Hinson as author Downie "fell out of the top" of a too-big loop. Airspeed is almost zero; rate of climb over 2,000 f.p.m. (There is a lag in indicator.) Plane had just been kicked off to the left to avoid a tailslide.



and daylight when the nose of N8307M zeroed in on the factory flight strip. The flight had been both informative and good fun. Of lesser importance, No. 7 *Aerobat's* "new contoured cabin ceiling of easy-to-clean, rip-resistant Ensolite" (quoted from a company news release) remained unsullied.

One of the most interesting, enlightening items about the new 150 is its Owner's Manual. There's a long-overdue eight-page chapter on "Emergency Procedures." This same information, modified to fit different aircraft, is carried in all Cessna 1970 manuals. This tell-it-all Section IV in the *Aerobat* manual has chapter headings on electrical power supply malfunctions, excessive rate of charge, insufficient rate of charge; rough engine operation or loss of power—including spark plug fouling, magnetos malfunction, and low oil pressure. There's briefing on forced landings, both precautionary and without power, and a half page on ditching. Procedures are detailed for disorientation in clouds, executing a 180° turn in clouds, and emergency letdowns through clouds, plus recovery from a spiral dive.

This straight-from-the-shoulder chapter includes the remote possibility of

fires during start on the ground or in flight, and electrical fires. There's briefing on flight into icing conditions and on bail-out. Since the *Aerobat* is probably the only Cessna to be flown consistently with chutes, it's improbable that bail-out procedures would be listed in other manuals. Hats off to Cessna for briefing their new customers on how to handle the rare emergency situations that are possible but improbable in today's aircraft! If the pilot—either 20-hour student or 20,000-hour old-timer—knows the proper emergency procedures, he has a much better chance of reporting a minor incident rather than a major accident. Never have eight truthful pages of an "ops manual" been used to better advantage. At least, that's my personal opinion.

We had a most interesting after-flight debriefing on a number of technical points about the *Aerobat* program with Bill Thompson. The Cessna aerodynamicist pointed out that the design envelope covered plus six and minus three Gs with an added safety factor of 50%. He suggested that somewhere between seven and nine Gs, one might look for permanent wrinkles on the top of the wing skin, working on a diagonal from

the strut fitting to the fuselage.

We asked about the possibility of structural damage due to accidental tailslides. Thompson described a flight he had made with a woman pilot (not Joyce Case) where "we started a hammerhead stall and she pulled a little past straight up. While she was correcting, we ran out of speed. She put in full right rudder, but that was balanced by torque from the engine, and we started a tailslide. It seemed like we went backwards for an hour, but actually it was only a few seconds. Fortunately, the gal kept a tight grip on the controls, so there was no violent reaction into the stops as we swapped ends and started straight down. I have no reservations about the *Aerobat's* ability to withstand a tailslide, but 'the book' and good judgment say don't do it deliberately."

Bill Thompson was asked about the possibility of the *Aerobat* "beef-up" becoming part of the regular 150 production line. He answered, "We must state emphatically that 16 pounds is too much dead weight to carry around for the normal category user. You would be surprised how we scramble to save even a pound or two to obtain the greatest possible payload." □