

Pilot Flight Check:

The DECATHLON

by RUTH and DON DOWNIE / AOPA 188441

Bellanca Aircraft Corporation's new Decathlon is designed to do one thing, and does it very well. The fully aerobatic two-placer is stressed for +6 and -5 Gs. With a 150 hp Lycoming mated to a Hartzell constant-speed prop, the new airplane will do almost all the "outside" maneuvers that were formerly restricted to "inside" gyrations with the -2 G-load limit of the Citabria.

The Decathlon is designed for air show-off, aerobatic competition, but it also makes a superb aerobatic trainer. While it looks a bit like Bellanca's Citabria line, the resemblance is not even skin deep. The new Decathlon has a fully inverted fuel and oil system that's "approved" for a full two minutes, but it has been flown for more than four minutes upside down. The wing has been shortened by 18 inches, with an increase of four inches in wing chord, and there's an expanded aileron chord for a faster, easier rate of roll. The airfoil was changed to a nearly symmetrical NACA 1412 which, according to experimental flight test engineer Mike Polad (AOPA 194123), "provided a greatly increased negative lift coefficient with only a very slight decrease in the positive lift coefficient. The smaller negative pitching moment coefficient of the 1412 airfoil permitted the negative incidence of the horizontal stabilizer to be reduced, thereby decreasing tail drag and permitting alignment of the stabilizers and elevators in flight . . . [and] has made it possible to trim for 'hands-off' inverted flight."

In pilot-language, the Decathlon flies just about as well inverted as it does right side up.

Heavier wing spars, closer rib spacing, larger struts and a redesign and beef-up of the aft fuselage have produced a redline speed of 180 mph vs. the 162 mph on the Citabria. The redline speed is limited by windshield strength. Development of a heavier windshield is now in the works to increase speed to 202 mph. Retrofit will be

available. The Decathlon's gross weight is greater than the Citabria's (1,800 pounds to 1,650), which shows up in a slightly slower rate of climb (1,025 fpm vs. 1,120 fpm) and a markedly longer takeoff roll at higher altitude airports. We had ample opportunity to observe the Decathlon at altitude while crossing the Rocky Mountains west of Denver on a ferry flight from Bellanca's plant to Sedona, Ariz., where it was to be picked up by its new owner.

Decathlon No. 8, N11855, was the first unit of this new breed headed for the West Coast. Even in a bitter, freezing crosswind at Osceola, Wis., it had to have the sexiest paint job since Eve. The red-white-and-blue sunbursts, air show striping, a myriad of white stars and red-red struts made the ship look as though it were already on display.

We filled out the paperwork, eyeballed fuel topping after the Decathlon had been pried from its ice-filled tie-downs and stowed our baggage. Useful load on the Decathlon is 575 pounds, which includes 40 gallons of fuel on cross-country, passengers and baggage. In spite of the added weight in beef-up, however, this useful load is still some 50 pounds higher than the standard 150 hp Citabria because of the higher all-up gross weight of the Decathlon.

We were grateful for the slightly higher wing loading (10.7 pounds per square foot vs. 10) as we taxied out into a shifty north wind of 20 knots that was blowing clouds toward Texas;

a telephone weather briefing indicated a steady improvement as we went south and west.

We eased in full upwind aileron, downwind rudder and throttle all at the same time as we taxied. Acceleration was excellent in the cold weather and the gaudy Decathlon rolled smartly up on the upwind (right) wheel as our speed picked up. Torque and plenty of right rudder kept the nose of the taildragger where it belonged until the ship really wanted to fly. (The new airfoil has a distinctive feel on takeoff and landing. It is completely different from the standard Citabria and somewhat reminiscent of a heavily laden old Taylorcraft.)

As predicted by Bellanca's factory hands, I found the control forces were light, indicating sustained aerobatics should be "no strain." We explored the wonderful realm of inverted flight a couple of days and a couple of thousand miles later.

The Decathlon is easy to see both in the air and on the ground. In addition to the air show paint job, there are two rotating beacons, one atop the fin and the other between the landing gears. If you look closely, you can see reflections off this lower beacon on the bright wheel fairings. For conspicuousness, this system beats the predominantly white or natural aluminum surfaces on many other production models.

Mike Dewey, who had bought the Decathlon from Bellanca, arrived at the

It's heavier and faster than Citabria and has makings of a good aerobatic trainer, says evaluator. Control pressures less in steep turns and partial rolls than in Citabria

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picturesque table-top Sedona (Ariz.) Airport within minutes after we touched down. He was making a Shell Oil Company TV commercial that will have a billion "exposures" on the tube. The production team included 13 Hollywood experts, a turbocharged helicopter and a very expensive gyrostabilized camera mount.

Shortly after sunup the next morning, Mike explored the aerobatic capabilities of his sporty new Decathlon when a rare cloudy day X'd-out the TV commercial filming. After Mike had gone through a complete aerobatic series, he landed with a self-satisfied grin, opened the door, climbed out of his bright blue safety parachute, and shouted, "It's all yours. Go have fun."

We removed the back cushion from the front seat to give me a little more legroom. That front pit could be a problem to get out of, even though the motivation might be singularly urgent. There are three latches on the door, with one parallel to the front hinge line. You're strapped in with a chute, standard seatbelt, and shoulder harness. In addition, there's a two-inch twin aerobatic seatbelt with an individual lock. (I added an extra thousand feet of maneuvering altitude for each of the three restraints.)

Sans baggage and passenger, N11855 quickly found a home high in the sky.

I reverted to habit patterns dating way back to USAAF cadet instruction in PT-17 Stearmans and explored the wonderful world of rolls-over-the-rocks. First, a straight-ahead stall and the horn blows off-key, then accelerated stalls out of a turn. The Decathlon is honest, but it flies a great deal like a heavy AT-6. Spin recoveries underlined this characteristic. The symmetrical airfoil on the Decathlon makes you fly it all the way through a spin recovery. (You can't just relax on a maneuver and have the ship pop level as you can do with the Citabria and some other light aerobatic trainers.) When you fly the Decathlon, plan for full rudder against the spin for a half-turn and then definite forward stick to stop the rotation. After that, don't hurry the recovery pullout or you'll find a classic secondary stall. (Nothing hazardous here—this is the way a good aerobatic plane should react—but it is just a little different.)

The Decathlon will make an excellent trainer for those pilots who want to learn "survival aerobatics." In my book, that's just two maneuvers—spin recovery, and the capability to roll off your back in wake turbulence. (A split "S" in such a situation, and you're a statistic!)

Rate of roll for the Decathlon is delightful. A brochure lists the rate of 20 degrees a second, but that is a misprint. One-hundred and twenty degrees a second would seem to be more in line—or 3½ seconds for a full aileron roll.

The one really unusual feature of rolling around the skies in the new Decathlon came from the constant-speed prop. You can do loops and associated flip-flops without ever touching the throttle, since the Hartzell propeller is

counterweighted to allow speed right up to redline without overspeeding. In case of loss of oil pressure, the counterweights force the prop into low rpm (about 1,650), "thereby preventing overspeeding and possible loss of propeller blades in case of inadvertent loss of oil pressure," state Bellanca's engineers.

Only maneuvers never approved for the Decathlon are tail slides and the Lomcevak. According to Doug McConnell, "There is no specific disapproval. We did not seek approval. Reverse flow is too hard to stress-analyze and substantiate for certification. Owners are doing both successfully and frequently."

An accelerometer is required in the aerobatic category. Entry speeds for the various standard maneuvers are:

	mph	knots
Loop, normal or inverted	140	122
Hammerhead	130	113
Immelmann	145	126
Snap roll	90	78
Slow/barrel roll	130	113
English bunt (the first half of an outside loop)	70	61
Vertical slow roll—up	175	156
Vertical slow roll—down	60	52

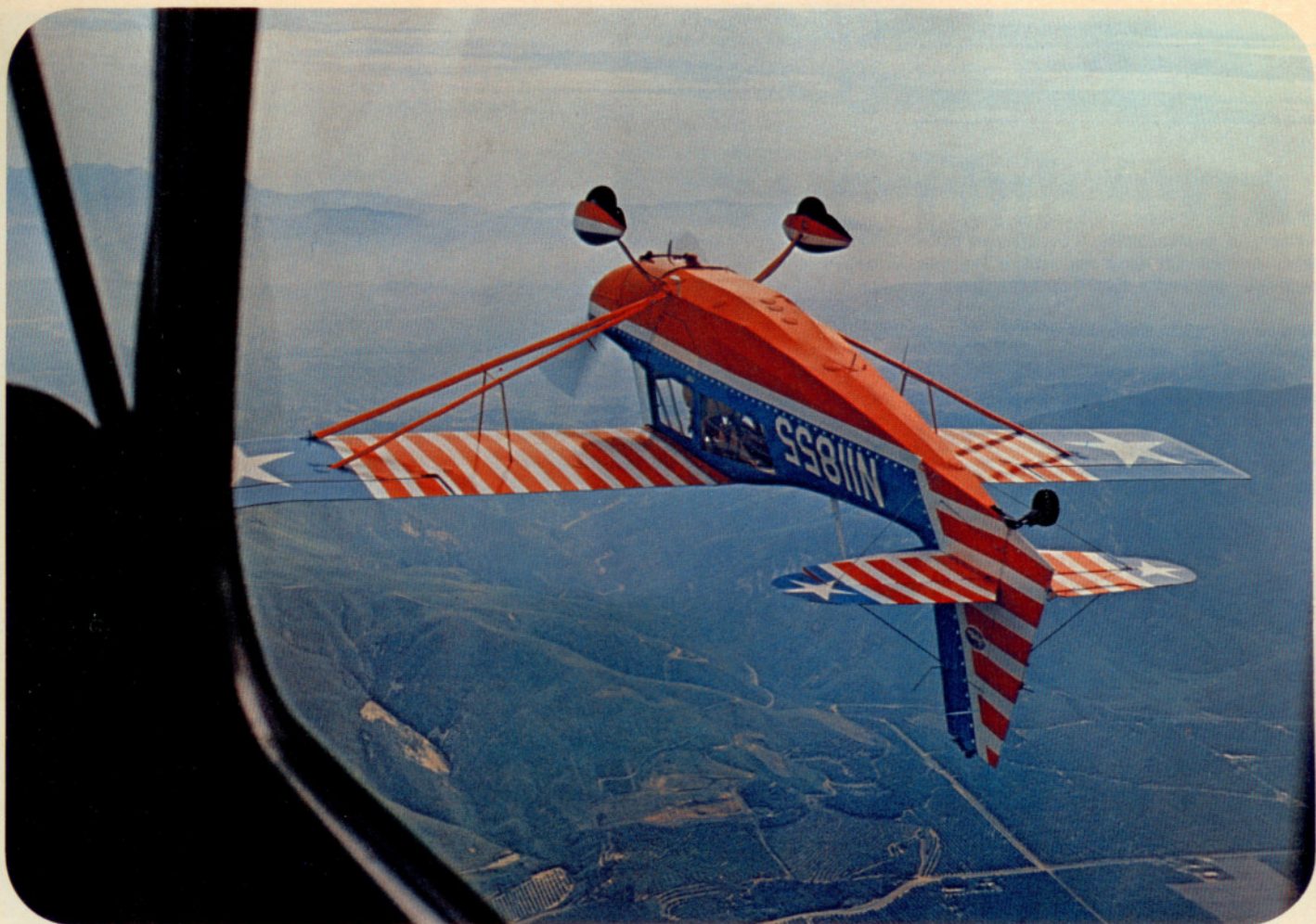
After a half hour or more of rolling around the skies over Sedona, it was with some reluctance that I finally did a half loop, slowly rolled out the top, made a clearing turn followed by a two-turn spin, then let down at 175 mph into a long 45° entry to the pattern. (Even inside the triple-latched cockpit, you can still hear the whistle of the wind through the struts. And on a cold day, this sure beats an open cockpit for comfort.)

Time was when aerobatics were considered show-off maneuvers for the dashing helmet-and-goggles set who needed massive ego injections. In this reporter's opinion, this is not so today. Aerobatic training can make you a better pilot and, what's more, it's great fun.

An unplanned opportunity came up the next morning to compare the Decathlon and Citabria 150 back-to-back. One of the members of the TV commercial production crew tripped over a tiedown cable in the chilly predawn. Result: one dislocated collarbone, painful but not critical. It's a slow, winding drive up Oak Creek Canyon to the hospital at Flagstaff. Mike Dewey suggested I ferry the injured man up in his Citabria 150, N11867. The victim was eased into the back seat and I warmed up the engine while a call was made to have an ambulance meet us at Flagstaff's airport. Some dozen minutes later, I parked in front of the terminal just as the ambulance drove

Decathlon vs. Citabria Specifications

Category	Decathlon 8KCAB	Citabria 7KCAB
	Normal & aerobatic	Normal & Aerobatic
	FAR 23	CAR Part 4a
Load limit factor	G +6 -3	G +5 -2
Never-exceed speed (mph)	180	162
Powerplant	Lycoming IO-320-E1A 150 hp @ 2,700 rpm	Lycoming IO-320-E2A 150 hp @ 2,700 rpm
Propeller	Hartzell HC-C2YL-4/ C07663-4	Sensenich 74DM658-1 -56
Fuel capacity (gal)	40	40
Oil capacity (qt)	8	8
Seating capacity	2	2
Gross weight (lb)	1,800	1,650
Empty weight (lb)	1,225	1,128
Wingspan (ft, in)	32.0	33.6
Wing loading (lb/sq ft)	10.7	10.0
Wing area (sq ft)	169	165
Length (ft, in)	22.75	22.58
Cruise speed (mph, 75% power)	135	125
Stall speed (mph)	53	51
Top speed (mph)	145	130
Rate of climb (fpm, sea level)	1,025	1,120
Service ceiling (ft)	16,000	17,000
Base price	\$15,000	\$10,750



"The Decathlon flies just about as well inverted as it does right side up," state authors.

All photos by the authors

up. After his shoulder was popped back into place, the victim was A-OK and back at work later in the day.

The standard 150 Citabria broke ground with a noticeably shorter roll than the Decathlon and climbed just a little more rapidly. I flew very gingerly on the trip to Flagstaff, naturally, but returning solo, there was an opportunity



Red-white-and-blue sunbursts, air show striping, and an abundance of bright white stars, show off Decathlon's "sporty" look as it refuels at Alamosa, Colo.



Similarity of Decathlon (foreground) to the Citabria (background) is deceiving. Decathlon's wing is shorter, heavier and nearly symmetrical, and the aft fuselage has been beefed up. Mike Dewey (AOPA 255296), Santa Paula, Calif., is piloting the Decathlon in this side-by-side shot. His father, Jim Dewey, is at the Citabria's controls.

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to compare control pressures in steep turns and partial rolls. The aileron pressures on the Citabria are much heavier to push around. The Citabria feels—and is—lighter in all-up weight, but the Decathlon with its symmetrical airfoil, has more float on landings.

Visibility from the front seat of either aircraft is outstanding. The “greenhouse roof” gives a surprising amount of around-the-corner visibility in tight turns as you look “up” through the roof. Back-seat visibility in the De-

cathlon can be a little restricted though, by the shoulder harnesses for the front seat.

In the “nit-picking” department, the Decathlon I flew was noisy in the cockpit compared to the Citabria. We both used cotton in our ears on the cross-country legs. The increase in noise level is probably associated with the prop, since the fixed-pitch paddle on the Citabria seemed more quiet. (Prior to our departure from Bellanca’s plant with the Decathlon, personnel there used two rolls of sponge rubber to fill the “whistly” space behind the windshield at the wing root. It was most appreciated.)

Also, I’d like to see a double latch system on the engine cowl to match the extra locks on window and door. On previous ferry flights of Citabrias, we have resorted to gun tape to assure that a loose Dzus (fastener) didn’t de-

tract from our flight. One of the first things the Decathlon we ferried got from its new owner was an extra pair of fasteners on each side of the cowl. (The very first thing the owner did was to replace the front main bearing seal, which leaked a little oil on the ferry flight to Sedona.)

The fine-tuning vernier control on the constant-speed prop does its job well, but its location below the instrument panel makes it difficult to reach while moving the throttle. An old-fashioned throttle quadrant from a WW-II AT-6 might seem more fitting in the sporty Decathlon.

At six-foot two inches, I can just reach the sealed gas caps on the Decathlon and a visual mark on the cap, as seen from the trailing edge, would give an added check that the caps were down and locked. Another little item of the nit-picking variety involves the fact that N11855 had a 1½-system Genave radio with an inexpensive microphone that left considerable to be desired. In addition to being noisy, the microphone is mounted so that the pilot’s natural reaction is to talk into the “back side” of the transmitter with zero-by-zero results. The omni bearing rotation knob on the Genave also chose to turn only in a clockwise direction, but that was only a minor annoyance.

Overall, and looking at the flight check in retrospect, it’s safe to say that both old-timers and neophytes should enjoy the delightful inside-and-outside world of the new Decathlon. □

This photo, dubbed “two-in-a-turn” by the authors, shows timing used in air show formation flying. Note sun glinting off almost identical surfaces of both aerobatic planes.

Bellanca Aircraft Corporation’s 150 hp Decathlon takes off from the table-top airport at Sedona, Ariz. Plane has a top speed of 145 mph and can climb out at 1,025 fpm.

