MAKING THE CONNECTION

Avions Mudry builds a good cross-country airplane that can turn your horizons upside-down.

BY MARK M. LACAGNINA

PHOTOGRAPHY BY THE AUTHOR

continued

It is the photographs on the wall at Mudry Aviation that catch your attention first. One is a black and white blowup of an Avions Mudry CAP 10B flying high formation on a Dassault Mirage. The picture is so preposterous as to suggest a composite. The fighter is flying at an incredible deck angle, and the little aerobat is hanging in there like a spunky little sparrow over a nest-invading crow. The picture is not a composite, however. Apparently, a French pilot wanted a picture of his two favorite airplanes flying in formation, *et voila.*

Another photo shows a CAP 10B in knife-edge, only a few feet above a runway. That's Daniel Heligoin performing his spectacular takeoff snap roll. Still another photo shows Daniel and his Mudry Aviation/French Connection partner, Montaine Mallet, standing with a tall, slim gentleman in a straw hat—none other than the inimitable Bob Hoover.

The headquarters of Mudry Aviation are located at Dutchess County Airport in Wappingers Falls, New York—a barrel roll away from Poughkeepsie. It's a friendly, comfortable place with the photos and stacks of aerobatic publications, training manuals and Aresti diagrams. In a corner, a metal rack is gorged with parachutes.

It is merely a way station, though: a convenient place for Daniel and Montaine to conduct preflight chalk-talks and postflight critiques with their aerobatic students, to meet with potential customers and to attend to the inevitable paperwork and telephone calls. The real offices of Mudry Aviation are parked outside in the sunshine: two CAP 10Bs sporting dazzling red, white and blue paint schemes.

Relatively few pilots in this country know much more about the CAP 10B than that it is the airplane used by Daniel Heligoin and Montaine Mallet when they take their graceful and thrilling French Connection aerobatic routine on the air-show circuit each summer. Show-biz is only one of the airplane's fortes, however.

The CAP 10B was conceived in the late 1960s as a solution to a problem. The French air force wanted an aerobatic trainer. In Europe at that time there was not much to choose from. Basically, there was the Czech Zlin and the Belgian Stampe, which had been out of production for two decades.

With characteristic national pride, Auguste Mudry—founder and owner of Avions Mudry et CIE, a glider manufacturing firm based at the Aérodrome de Bernay—decided that a French air force pilot should fly a French airplane. Further, Mudry decided the airplane should be a monoplane of simple construction with side-by-side seats for instructor and student.

Working from the basic design of Claude Piel's Emeraude homebuilt,

CAP 10B

For Montaine Mallet, there is only one way to perform an aerobatic maneuver: the right way.

Mudry fabricated the CAP 10 prototype, which then was fitted with a ventral fin and a larger rudder. The result was the B model.

The wing is semi-elliptical and is 26.4 feet long. The single main spar, the rear auxiliary spar and the lattice-type ribs are spruce, covered with 0.1-inch-thick plywood and wrapped in polyester fabric. The hinged, slotted ailerons comprise nearly 44 percent of the wingspan and are activated, of course, by a stick control. The trailing-edge flaps comprise about one third of the wingspan and are mechanically deployed to 15 and 40 degrees with a lever between the seats.

The fuselage is a spruce lattice joined by three bulkheads and covered with fabric. The forward structure is beefed up with an interior covering of 0.12-inch plywood.

The vertical stabilizer is an integral part of the fuselage. The vertical and horizontal stabilizers, as well as the rudder and elevators, have single spruce spars and are covered with plywood and fabric. A trim tab on the aircraft's right elevator is adjustable from the cockpit.

The main landing gear are 6.8 feet apart and are equipped with oleo struts for shock absorption. The disk brakes are hydraulically actuated both by toe pedals and a parking control. The tail wheel is solid rubber and mounted on an elastic shock absorber. The tailwheel is steerable through linkages to the rudder pedals. It also can be disengaged for tight maneuvering with differential braking.

The CAP 10B is powered by a 180-hp, fuel-injected Avco Lycoming AEIO-360 engine, equipped with Christen inverted oil and fuel systems and a wooden, fixed-pitch Hoffman two-blade propeller. The nonflammable, laminated-plastic cowling is hinged to provide a thorough examination of the engine during preflight.

There are two fuel tanks: one of 19 gallons usable capacity behind the firewall; another of 20 gallons capacity beneath the rear cockpit baggage shelf. Only the forward tank is rigged for inverted flight. The rear tank must be dry for aerobatic flight.

The French government was pleased with Mudry's airplane and ordered 36 of them. After completing the order in 1973, Mudry went after the civilian market. He did, of course, have this in mind all along. The CAP 10B was intended not only to be an aerobatic trainer but a cross-country aircraft as well. Mudry wanted the airplane to be agile enough to handle advanced aerobatic maneuvers and stable enough for a relaxing cruise. The latter was accomplished with five degrees of wing dihedral. Most aerobatic airplanes have no dihedral, which optimizes flight control in inverted attitudes. The CAP 10B requires a little more work to keep the wings level when inverted, but this could be all for the better in student training. On the other hand, it does not require constant attention to maintain a heading during normal cruise.

The CAP 10B was type-certificated by the Federal Aviation Administration in 1974 for day and night VFR operations. To date, the FAA has issued only one airworthiness directive, AD 80-24-52, which required owners of the first 97 production airplanes to check their wing-spar flanges for

An unusual view of The French Connection in action: Montaine Mallet has rolled inverted, and her CAP 10B is reflected in the canopy of Daniel Heligoin's airplane. From the ground, the mirror image looks graceful and easy. In the air, it's unflinching concentration.

cracks and to repair them, if necessary.

In the past 12 years, Avions Mudry has built about 200 CAP 10s. According to Montaine Mallet, almost every major flying club in France operates at least one of the airplanes. Indeed, the company has found a good market for the airplane all over Europe, and some CAP 10s also have found homes in Africa, Iceland, Tahiti and South America. Last year, the Mexican air force placed an order for 20 of the airplanes. It intends to use them for primary as well as aerobatic training. There are a few in the United States, most in the hands of private owners. Although Gene Soucy, a member of the Eagle Aerobatics Team, operates a CAP 10B at his school in Addison, Texas, most fixed-base operators here unfortunately have chosen to stick with their Decathlons, Citabrias and Super Cubs. While these airplanes are without doubt a lot of fun and can teach you much about flying, they are without a doubt slugs compared with the CAP 10B.

Here, the only production airplane comparable to the CAP 10B is the Pitts S-2A—a 200-hp, tandem-seat biplane. With a weight-to-power ratio of 7.5 lb/hp compared with 10.2 for the CAP 10B, the Pitts does have an edge in performance. How much of an edge is debatable. The Pitts can do two vertical rolls. The CAP 10B can, too, but only if it is carrying a light load and if the engine is tweaked above the maximum recommended 2,700 rpm. One pilot who has flown both airplanes extensively offered this observation, "Both are fine performers. The Pitts is a real thoroughbred, though, and can be a bit scary for the beginner to handle. The CAP 10B is a much more comfortable training platform."

My first flight in a CAP 10B consisted of a few steep turns, some stalls and spins and a couple of touch-and-goes—just to get a feel for the airplane. Daniel Heligoin added some spice to the demonstration with an assortment of loops, rolls and hammerheads.

At first sight, a CAP 10B looks delicate, almost fragile. It has none of the hard, squared-off edges or can't-bust-'em braces seen on most aerobatic aircraft. But looks are deceiving. Beneath the beauty, the CAP 10B is a beast. It is approved for all Unlimited maneuvers: outside loops, inverted reverse Cuban 8s and so forth. However, the pilot should remember that the airplane is very clean and can build up speed very quickly. Airspeed should be kept below redline, 183 knots, and the airplane should not be allowed to exceed 4.5 Gs negative or 6 Gs positive.

Preflight is straightforward. Before aerobatics, the fuel level in the forward tank is checked visually; the rear tank must be empty. The oil cap must be secured firmly, and the canopy should

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CAP 10B

Avions Mudry CAP 10B
Base price $67,700
AOPA Pilot Operations/Equipment Category*:
Sport/Special-purpose $68,025
Cross-country $83,297 to $85,147

Specifications

Powerplant	Avco Lycoming AEIO-360-B2F 180 hp @ 2,700 rpm
Recommended TBO	1,400 hr
Propeller	Hoffman 2-blade, fixed pitch
Length	22 ft 11.4 in
Height	7 ft 6.5 in
Wingspan	26 ft 4.8 in
Wing area	116.78 sq ft
Wing loading	15.69 lb/sq ft
Power loading	10.18 lb/hp
Seats	2
Cabin width	3 ft 5.4 in
Empty weight	1,200 lb
Gross weight	1,832 lb
Max aerobatic weight	1,677 lb
Useful load	632 lb
Payload w/full fuel	394 lb
Max takeoff weight	1,832 lb
Max landing weight	1,766 lb
Fuel capacity, std	246 lb (237.6 lb usable) 41 gal (39.6 gal usable)
Oil capacity, ea engine	8 qt
Baggage capacity	110 lb

Performance

Takeoff distance ground roll	1,149 ft
Takeoff distance over 50-ft obst	1,477
Max demonstrated crosswind component	20 kt
Rate of climb, sea level	1,000 fpm
Max level speed, 500 ft	145 kt
Cruise speed/Range w/no rsv, std fuel (fuel consumption, ea engine) @75% power, best economy	
500 ft	130 kt/572 nm (540 pph/9 gph)
5,000 ft	117 kt/515 nm (540 pph/9 gph)
10,000 ft	112 kt/493 nm (540 pph/9 gph)
Service ceiling	18,000 ft
Landing distance over 50-ft obst	1,968 ft
Landing distance, ground roll	1,182 ft

Limiting and Recommended Airspeeds

Vx (Best angle of climb)	72 KIAS
Vy (Best rate of climb)	78 KIAS
Va (Design maneuvering)	108 KIAS
Vfe (Max flap extended)	86 KIAS
Vno (Max structural cruising)	162 KIAS
Vne (Never exceed)	183 KIAS
Vs1 (Stall clean)	54 KIAS
Vso (Stall in landing configuration)	46 KIAS

All specifications are based on manufacturer's calculations. All performance figures are based on standard day, standard atmosphere, at sea level and gross weight, unless otherwise noted.

**Operations/Equipment Categories are defined in June 1983* Pilot, *p. 96. The prices reflect the costs for equipment recommended to operate in the listed categories.*

be inspected to ensure that it is firmly in its tracks.

The flaps are not stressed for boarding, so you must step over them onto the wing to get to the cockpit.

Cinching up all of the harnesses, belts and restraints is the most time-consuming task. First the parachute; the straps should be snug but not too tight. Then the seat harness: two belts over the shoulders, two over the pelvis and one over the crotch. Scrunch back into the seat as far as you can and pull the lap and crotch belts tight, tighter. If you don't, you'll experience a curious sense of detachment on your first inverted maneuver. Over the whole affair goes a wide lap belt. Finally, the headphones are hooked up. These are necessary as there is very little, if any, soundproofing in the CAP 10B.

Once you are settled in, you hope that you have remembered to turn on the battery switch, which is located on the bulkhead behind the seats. If you have forgotten it, you'll get more practice in uncinching and cinching.

All of the other switches and controls are within easy reach. There are two throttles: one in the center of the panel; the other, a side-arm control for the left-seat pilot. The mixture control is in the extreme left side of the panel.

Starting the fuel-injected Lycoming is easy. Switch on the electric fuel pump for about 10 seconds to prime, hit the starter and advance the mixture as the engine catches. The oil temperature and pressure, battery temperature, fuel quantity and cylinder head temperature gauges are located in the center of the panel.

Even in a three-point stance, visibility over the CAP 10's engine cowl is adequate. No S-turns are required for normal ground maneuvers. The CAP 10's steerable tailwheel is capable of handling all but the tightest taxi turns.

The canopy must be closed at all times in flight. After sliding forward, it is secured with a half-turn on a black handle. Keep your hand off the red handle, though. This one releases the attachments so that the canopy can be jettisoned during an emergency.

Takeoff normally is made with one notch, 15 degrees, of flaps. The rudder becomes active very early in the roll, and it is very sensitive. Except with a strong left crosswind, directional control can be maintained by gently applying or releasing pressure on the right rudder.

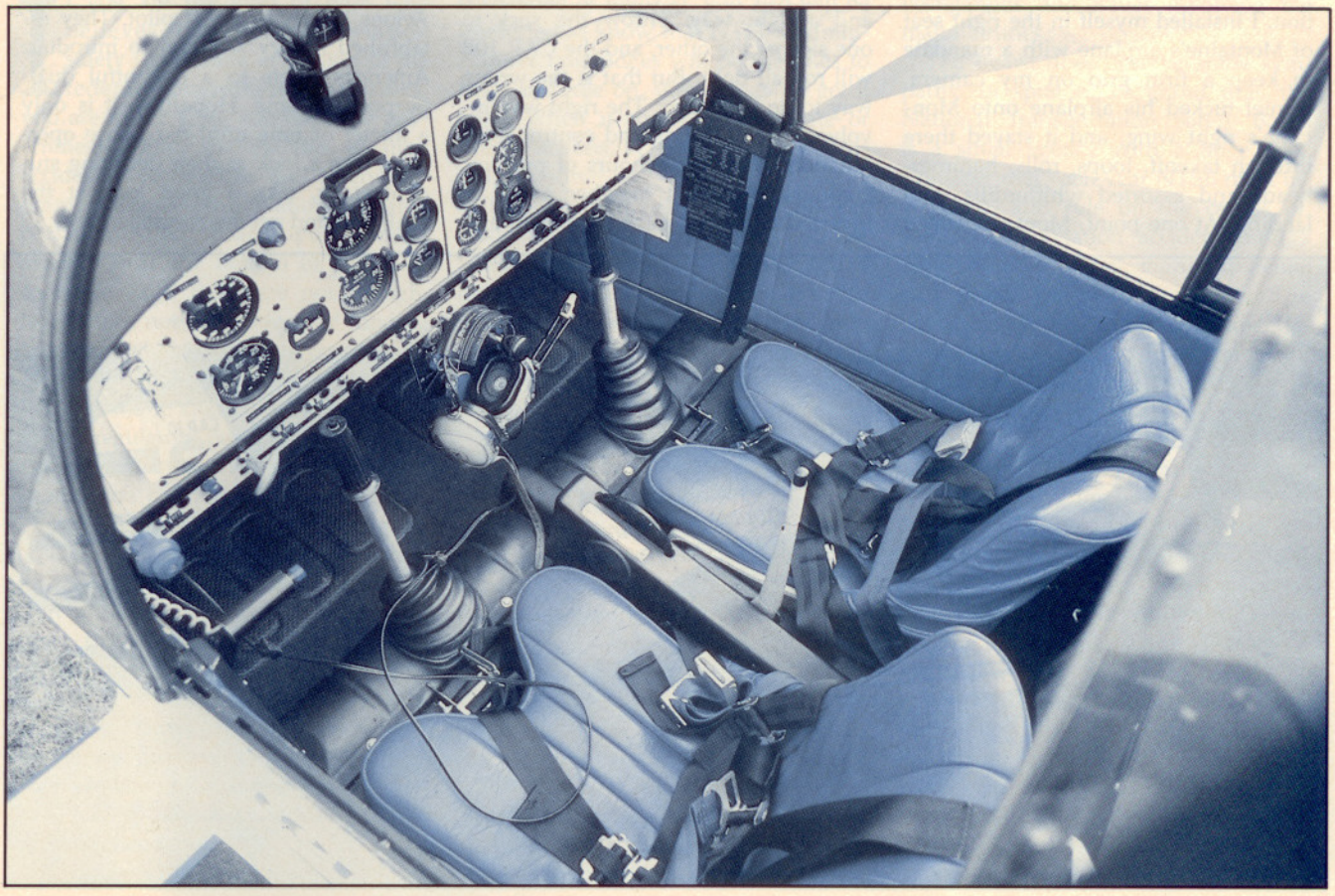
Airspeed for best initial rate of climb is 78 knots. Then accelerate to 87 knots and retract the flaps. On my first flight in Daniel Heligoin's airplane, I was surprised to see the vertical speed indicator pegged at only 500. Daniel grinned and explained that the instrument is calibrated in meters. We actually were ascending at more than 1,600 fpm, with a brisk headwind.

The flight controls are poetry. They are light, responsive and balanced like a fine Swiss. . .whoops, French watch.

The CAP 10B is a powerful little rascal. There is no need to drop the nose to pick up airspeed before initiating a maneuver. Straight and level, you merely adjust the throttle to attain the proper entry speed and go for it.

True to Mudry's advertisements, the CAP 10B is a tiger in the air but a pussycat on landing. Final approach speed with full flaps is a slow and comfortable 65 knots. Lift the nose a tad to bleed off airspeed in the flare, and the airplane settles lightly on all three wheels. After a few tries, I was making some respectable landings in the CAP 10B, which is saying much for the airplane since my landings, even in tricycle-gear spam cans, can be more objectively described as arrivals.

The airplane is an opiate. Fly it once,



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CAP 10B

In the hands of a pilot like Daniel Heligoin, the CAP 10B can do all Unlimited maneuvers.

and you will want to fly it again and again. On my second visit to Mudry Aviation, Daniel and Montaine had a little surprise for me. They wanted to demonstrate the airplane's capabilities, and they wanted to do it in style. So, for a glorious hour, I became an unofficial member of The French Connection. I installed myself in the right seat of Montaine's airplane with a mandate to keep a firm grip on my camera. Daniel tucked his airplane onto Montaine's right wing, and it stayed there through takeoff, loops, rolls, hammerheads and assorted whifferdills, and landing. At one point, Montaine rolled inverted, and Daniel tucked his airplane underneath. It was quite a sensation to look straight down through the canopy and see Daniel, inches away, smiling up at me.

Later, I spent about three hours with Montaine exploring the proper execution of a roll. There is a wrong way and a right way. Throw the stick to one side or the other, and the CAP 10B will roll all right. But that is the wrong way to do it. Sloppy. The right way involves careful timing and control coordination. After three hours of practice, I could almost put together a roll to inverted and a roll back to straight and level for a passable maneuver. Almost.

Montaine and Daniel are perfectionists. She holds graduate degrees in aerodynamics and has more than 3,000 hours of flight time in the CAP 10B. Daniel was a fighter pilot and flight demonstration team leader in the French air force before signing on with Avions Mudry as a test pilot. They established Mudry Aviation to introduce American pilots to a delightful dual-purpose airplane. Hopefully, it is only a matter of time until fixed-base operators take a look at their declining student starts, take a good look at the CAP 10B and get the message. □