Maule's M-4 Strata-Rocket comes off looking a little old-fashioned (tailwheel, wing struts, bracing wire in the tail), but its STOL characteristics are earning it renewed attention

The Double-Whomp Landing Plane

by JOHN PENNINGTON / AOPA 155101

■■ While putting the M-4 Strata-Rocket through its paces (with him smiling shyly in the right seat), then again on the ground later (when he talks about the airplane he has created), a thought bordering on psychedelic imagery occurs to me: Wouldn't it be fascinating to flash the thought processes of Belford D. Maule (AOPA 173654) onto a wide screen, in living color?

There's no way to prove it (you can't get that much conversation out of Maule—he has a tendency to sort of shuffle out of range and answer with a word or, at most, a phrase), but what you probably would see in this psychedelic projection would be lines, curves, and numbers shifting rhythmically into place to become chord lines, wing twist, leading edges, trailing edges, flap slots; all fitting together finally into an airplane in flight through a *visible* relative wind, where the angle of attack could be more clearly understood than ever before.

B. D. Maule must have a way of seeing the wind. How else could he build an airplane that has struts and wheels dragging in the air but leaps off like an invigorated grasshopper, bombs along at 175 mph on 10 gph, stalls docilely with full flaps at 40, and rolls to a landing stop in only 10 times its own length?

The Maule M-4 Strata-Rocket is in production in a hangar/factory on the edge of Spence Field at Moultrie, Ga., where Maule sought and found refuge in 1969 from labor problems in Jackson, Mich., where his facility was previously located. *(Continued on next page)*

Belford D. Maule, with his M-4 Strata-Rocket. Note the curved wingtip and wheel speed fairings. All photos by author

I had stopped by the Maule factory a few months earlier, when the economic recession had aircraft makers drastically cutting production and laying off workers. Even then I found Maule striving to fill orders that sort of materialize without any great sales effort. This is no Wichita-style mass production, understand. It's a hangar operation where south-Georgia natives are putting together six airplanes a month—by hand.

Now I was back for The PILOT to find out more about Maule and his operation, and to see how his M-4 airplane flies. It carries a suggested list price of $16,495 sans avionics.

Don Easter, Maule's genial assistant who runs the shop, deals with the FAA, handles sales, and talks to visitors so Maule won't have to disrupt his tinkering and inventing, walks me casually toward the open hangar doors. He is grinning like a kid with a new bicycle as we approach an airplane on the ramp. The airplane looks like a Maule M-4, except for one thing: The tail

With designer and test pilot Maule at the controls, this is the M-4 in a steep climb immediately after an approximate 200-foot ground run.

The M-4 panel at cruise speed. Though possibly not too clearly shown, the airplane is in level flight at 4,200 feet msl, indicating 155 mph (about 174 mph true), at 75% power.

section has been completely changed so that its appearance aft is somewhat like that of the Bellanca Viking. It is labeled STOL and *experimental*. So Maule, who has been demonstrating the 200-foot takeoff and landing in his M-4 for years, is now shooting for something even more spectacular.

"We're going to call this one the M-5 Lunar-Rocket," Easter says. "You can see where it's different. It has 30% more flap area. It has a new empennage, with more rudder, more elevator, more horizontal and vertical stabilizer, and a larger dorsal fin.

"With these changes," he says, "we hope to increase the angle of attack and decrease the stall speed." Initial talk is that the basic M-5, without avionics, will sell for about $1,000 more than the M-4.

Maule appears from somewhere among the 20 airplanes in various stages of construction on the assembly line, ready to fly for the camera. He likes to do this: a ramp takeoff during which he rotates the airplane into a very steep initial climb so that it will look good in photographs. He does it first with the new, experimental model, N40300, then with his production model demonstrator, N2080U.

Maule is still testing and not talking numbers on the M-5 Lunar-Rocket, but it is quickly obvious that it gets off the ground sooner and holds its steep angle of attack longer than does the M-4 Strata-Rocket. This in no way talks down the M-4's performance, for I was soon enough to learn that the kind of takeoff Maule demonstrates for the camera is equally exciting when witnessed from inside the airplane. In fact, he has me doing the same thing in short order.

The M-4 is a high-wing taildragger, with wing struts and bracing wire in the tail section. It comes on looking a bit old-fashioned, an appearance that is hard to keep in mind when you're in the pilot's seat. The airplane excels in the takeoff and landing department, making short fields routine. But cruise is not sacrificed to achieve this performance. It excels here also.

Maule designed the airplane bearing his name in 1956, completing the first one in 1957, and beginning commercial production in 1961. He has added refinements through the years. The airplane has been powered by the 145 hp Continental, the 180 hp Franklin, the 210 hp Continental, and now the 220 hp Franklin, the only powerplant currently offered.

We climb into the demonstrator—Maule in the right seat—and get ready to fly. Maule wastes no words here either. He gives me no discourse on how to fly the plane; no listing of numbers to remember; no injunctions. He points out the throttle is the vernier type, and suggests we use the ramp for takeoff, pointing in the direction of a clump of loblolly [thick-barked] pines a few hundred feet away.

M-4 Strata-Rocket

Configuration	4-place
Gross weight (lb)	2,300
Empty weight (lb)	1,250
Useful load (lb)	1,050
Wingspan (ft)	29.66
Length (ft)	22
Height (ft)	6.17
Fuel capacity (gal)	42
Cruise speed (75%, mph, optimum altitude)	180
Stall speed (full flaps, mph)	40
Rate of climb (gross wt., fpm)	1,250
Rate of climb (1 person, ½ fuel, fpm)	2,100
Service ceiling (ft)	19,000
Absolute ceiling (ft)	21,000
Maximum range (miles)	680
Base price	$16,495

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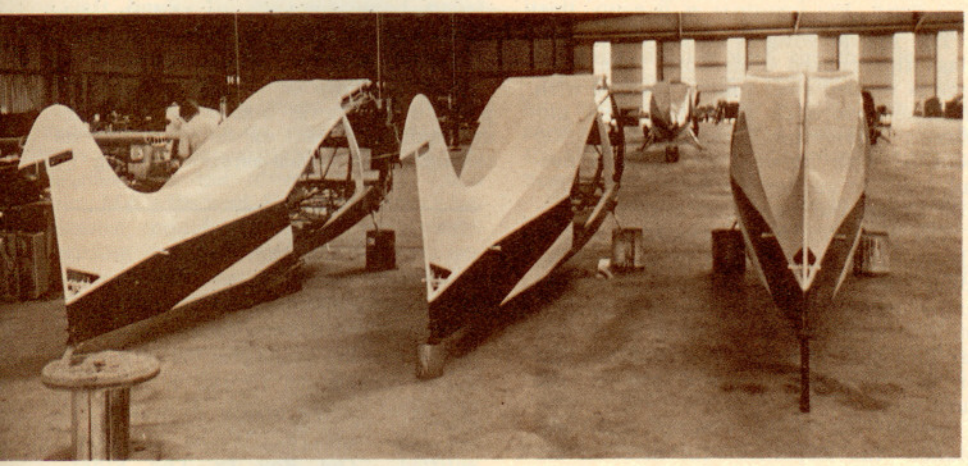
For takeoff, you set the trim, pull the manual flap lever on the floor between the two front seats to the first click for 15 degrees (the next click is for 35 degrees), point the nose the way you want to go, push the prop control and throttle all the way in, push the control wheel forward instantly to get the tail up, and by the time you count to four or five it's ready to fly with lots of concrete ramp remaining below.

By the time you say "wow," you have cleared the pines and started trimming to climb speed. We are somewhat light, only two aboard and fuel tanks about half full, and 90 mph on the airspeed indicator pegs the initial rate of climb at 1,500 fpm. The climb is relatively steep; at 90 mph the nose is on the horizon. The plane has a good, solid feel, yet responds to control pressures with alacrity. It flies nicely to trim speed, hands off.

At 4,000 feet msl, Maule suggests I level off at 75% power, 25 inches manifold pressure and 2,500 rpm, and let it get on the step. Soon the needle is pegged at 150 mph indicated, in level flight. I did not have a computer along, but estimated our true airspeed would have been about 168 mph. This is in the yellow, caution arc of the indicator, which begins at 145 mph.



Maule's hangar-factory at Spence Field, Moultrie, Ga. Note the variety of improvised "supports" for the gearless fuselages.

On another flight next day, Maule worked at it for a minute or two and got more from the same power setting—at one point he had it indicating 160, but it stabilized at about 155 for about 174 true. Maximum speed, according to the manufacturer's performance specifications, is 190 mph.

Stalls. First, power off, no flaps. With the nose held 10 degrees above the horizon, the airplane gradually slows until the stall warning light comes on as the airspeed needle reaches the edge of the green arc at 56 mph. But it flies on, gaining altitude, to 48 mph indicated before sinking—not breaking—into a gentle, fully controlled descent.

"Try it again," Maule says, "and enter it a little more sharply."

So, nose up again, more sharply this time, and a more rapid application of back-pressure on the controls. This time it stalls at 50, breaking gently into a downhill slide, still fully controlled with the ailerons.

In a power-off stall with full flaps, the airplane shows a vertical speed increase until, finally, the airplane quits flying with a gentle sigh at 38 or 40 mph, depending on the entry technique used. Again, the ailerons provide full control in the stall.

There is no shaking or buffeting to forewarn of an impending stall—only the flashing red light about 6 mph before the break occurs—but persistence is required to achieve the stalled condition, and it is likely to surprise only the grossly negligent pilot.

The M-4's big wing, with its tips curved well down, offers considerable stability in turns. I put the plane into 30° turns, both left and right, and left it there—hands off—for longer than one is likely to have his attention diverted from his chores. It simply kept on flying at the rate of turn established at the outset.

Back to Spence Field for landing and takeoff practice. The flying visitor to Spence is required to use Runway 4 for all landings (unless you're flying with Maule, who uses ramps and cowpaths), because the U.S. Air Force uses the other end of the airport for T-37 touch-and-go operations.

"They play at that end; we play at this end," says Don Easter with a smile.

Easter earlier had shared with me a technique he had discovered through many hours of trial and error in landing the M-4—how to achieve the desired attitude for a perfect landing.

"I make the final approach at 70, with power off and full flaps," he says. "After the flare, I get the nose up exactly even with the horizon, then hold it there and let it settle. This lets the tail touch first, which is the proper way to land this airplane."

With this in mind, and noting that Easter and I are about the same height and would share the same reference point, I set up a straight-in approach for Runway 4, trim for 70 with full flaps, and watch the airplane slide slowly and smoothly down that invisible line to the runway at 500 fpm. Just above the concrete I break the glide to level, then keep the back-pressure coming until the nose is precisely in line with the horizon. Shortly, without ballooning, it is ready to quit flying and a final tug on the control wheel assures that it is all the way back.

Now comes the little *double whomp* of an accurate Maule landing: The tailwheel hits the runway, followed by the main wheels, then *ker-whomp*, and you are rolling out with no tendency to bounce back into the air.

Prototype model of the Maule M-5 Lunar-Rocket, now in the testing stage. Main difference between it and the M-4 is the larger tail section, which somewhat resembles the tail on the Bellanca Viking.

We do this several more times, playing on Maule's end of the field, and along about sundown call it quits for the day. Next day we're at it again, this time to see if, after one exposure to the airplane, I can get something near maximum performance out of it.

After a few runs for practice, we pick a nice ramp that is about 500 feet

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long and that coincides directionally with a wind of about 5 mph. Again, we are well under gross with two aboard and a bit more than half full on fuel. Maule explains the technique: He sets flaps at 15 degrees, runs up to full power with the toe brakes on, begins the roll with tail up immediately, rotates and pulls full flaps simultaneously.

The book figure for a gross weight, sea level, no wind takeoff is 400 feet. Using Maule's technique, I was getting the under-gross airplane off in about 200 feet and landing within the same distance by using the brakes after touchdown.

We swap seats and Maule gets it off in 180 feet and down in 200. On one occasion, he inadvertently demonstrates what happens if the pilot rotates before the airplane is ready: If the speed is too slow for the big wing to grab the air and lift, the tail hits the ground and stops the angle of attack at 7½ degrees, from which point the airplane will fly when it's ready. The tail hitting the ground is a stop against the pilot prematurely rotating to a disastrously high angle of attack.

Maule explains all this, and he also explains the why of the *double-whomp* landing. On the ground, the airplane sits at an angle of 7½ degrees nose up. In the landing attitude, with the nose on the horizon, the pitch is 12 or 15 degrees. When the tail hits first, the nose pitches down to 7½ degrees as the main wheels touch. This decreases the angle of attack enough that, if the approach speed is right, you're through flying for that trip with no ballooning or bouncing.

My conclusion after two sessions in the M-4: It is a remarkable airplane, and it is fun to fly. The pilot with tailwheel experience will have no problem in getting checked out. The pilot accustomed only to a tricycle gear will require a little more time and patience. I would have felt comfortable flying the airplane away solo after 30 minutes and three landings in it, with my most recent tailwheel time more than two years past.

The airplane is comfortable. The noise level in flight is moderate. Visibility is relatively good. Entry and exit are easy, once you learn the in-out technique Maule uses. The control wheel is a simple oval ring with no contouring to the hand, and none needed, for the control touch is gentle. The panel is not the standard T arrangement, but easy to read.

The Maule wing is metal with fiberglass tips curved downward. The fuselage is welded steel tubing covered with lifetime razorback fiberglass. The airplane's maximum weight is 2,300 pounds, with about 1,050 pounds useful load. It carries 40 gallons of 100/130 avgas and burns 10 gph.

The airplane doesn't appear so at first glance, but it actually is a low-drag airfoil. Everything is so carefully shaped and hand-tailored by Maule that he may be getting lift out of the wing struts and landing gear fairings, and certainly out of the gracefully curved top of the fuselage.

Maule has been fooling with airplanes—his airplanes—for most of his life. He is now 60 years old. At the age of 19 he designed and built his first airplane, the M-1, then flew it after taking a correspondence course in airmanship. Later he took flying lessons: "I had to get my certificate." A few years later he built and flew an ornithopter, flapping his way along under his own power after having been towed aloft by an automobile.

Maule invented the steerable tailwheel and has produced thousands of them throughout the years. His factory at Moultrie turns out upwards of 7,000 tailwheels a year, using less than 1% of them for his own aircraft.

His plant is small, employing a total force of 45. Mrs. Maule is purchasing agent and Maule himself, in addition to his tinkering and inventing and working on various stages of construction of the aircraft, is production test pilot. When a new M-4 rolls off the line, Don Easter spends 30 minutes or so in a ramp check, then turns it over to Maule for first flight. When the airplane pleases its designer, it is then ready for the customer, whose order was in hand before construction was begun.

If the customer has a spirit of adventure, he will roll his new M-4 through the factory door, check the wind, climb aboard, and zoom off across the ramp toward a clump of loblolly pines. The plane that Maule builds is truly undemanding of real estate for either its takeoff or its *double-whomp* landing. □

THE AUTHOR

John Pennington needs little introduction to PILOT *readers. A staff writer for the Atlanta Journal-Constitution Sunday magazine, he is a frequent contributor to the magazine. His most recent article appeared in the December 1971* PILOT *and was entitled, "The Boy In The Right Seat."*