The Faster Mixmaster

By Gene Smith

We were 17,500 feet above the restless Pacific surf, eastbound in a hurry. It was quiet in the cabin, though we were striving for 300 mph true airspeed--and failing.

Art Scadenburg, in the right seat, blamed it on an induction leak that he had suspected earlier, but which simply hadn't shown up at the lower altitudes. Whatever it was, it was limiting us to 27 inches of manifold pressure on the rear engine and holding us to 155 knots indicated--about 20 knots below where we should've been.

Still, we were pretty rapid. The temperature was hovering around -10 degrees F outside, which meant N52DG was hustling along at 205 knots TAS. If any knowledgeable soul had been watching us from the Mount Palomar observatory inland, they might've observed, in some wonder, that Cessna Skymasters don't usually travel quite that fast. Not even P-Mixmasters.

Jack Riley has been working that kind of magic for better than four decades now, usually on some oddball piece of aeronautical hardware no one else would look at twice. He's still at it, and the strange twin-boom tandem twin-engine Skymaster is his latest creation.

Who's Jack Riley, you say? For shame! The cognoscenti know that Jack Riley is The Man In the Red Ankle Sox, and the spiritual heir to Benny Howard's fabled can of go-grease.

I flew the original P-Mixmaster one August day back in 1973. In fact, I nearly buried the thing in the melting asphalt of a county road on the way into Beaumont Hotel, 60 miles east of Wichita. As I recall, I left ruts about an inch deep and had to use half throttle on the rear engine just to keep from becoming a road ornament.

That was a nice airplane, able to post a maximum cruising speed of 208 knots at 33x2600 in the warm summer air--a long way from the first Mixmaster I ever flew. That was the fixed-gear Model 336, which cruised at 173 mph at 7,000' with a pair of 195-hp Continental IO-360-A's, back in the early spring of 1963. But that's a different airplane, and another story. Suffice to say, a lot of Mixmasters in various persuasions rolled out of the Wichita factories by the time Cessna threw in the towel on its twin-tailed bird in 1980.

Three hundred of the 336's were made and sold, followed by 1,992 normally-aspirated Model 337 retractables with 210-hp Continentals, about 650 225-hp turbocharged airplanes, and 356 P-birds, for a total civilian production run of about 3,300. Add to that at least 408 0-2s for the USAF in three configurations, and you can see that the odd-looking fore-and-aft Skymaster truly was a highly successful light twin.

One might ask why.

There are some clear drawbacks to the layout, as the Germans discovered with their revolutionary Dornier Do.335 Arrow. That push-pull twin probably was the fastest piston-engine fighter of World War II, with a claimed maximum level speed of 474 mph true. Unfortunately I've never had the chance to fly the Dornier, but I know a man who did, and he told me the thing had a nasty habit of overheating the rear engine so badly the big Daimler-Benz would burst into flame and burn through the elevator control cables. No wonder the Pfeil had one of the world's first bang seats. It needed one!

The Cessna has had its share of the same problem. Indeed, one of the most persistent complaints about the airplane has been that it's a maintenance hog--a direct result of cooling problems in the rear engine.

Jack Riley says he's fixed all that.

Riley holds the patent on an exceedingly effective intercooler design, and he puts the rig to good use once again in his recycled P-Skymasters. He says his combination of Riley intercooler, careful attention to internal airflow, and the big new turbocharged Continental IO-520's provide a permanent solution.

There are a few other problems with Mixmasters, too. For starters, there's no baggage compartment on the airplane because it's occupied by the rear engine. If you want to carry bags, you need a cargo pod. Cargo pods don't do much for your speed and fuel consumption, and Riley's conversions can't use them anyway because the air conditioner unit would be in the way. Then there's the vulnerability of the rear prop blades and the stabilizer to foreign object damage. The airplane's a great performer off short, rough fields---but I suspect if you do it often, you'd better have a thick wallet, because you're going to be buying some prop blades.

When this design first appeared, there was a lot of learned comment about how a tandem twin could never be as fast as a conventional twin because the rear propeller is operating in disturbed air and hence can't be as efficient. That's true---in theory. In practice, it's nothing to worry about.

What's far *more* important is that anyone who can fly a 210 can fly a 337, which is precisely why Cessna launched the design back in 1962. And that's exactly why Jack Riley is recycling P-Mixmasters as fast as he can get his hands on them.

All considerations of cost aside, there are clear safety advantages to a multi-engine airplane, particularly for night IFR or operations over water and rough terrain. On the other hand, there's an old saw that goes, "If you lose an engine in a single-engine airplane, you're in trouble. If you lose an engine in a twin-engine airplane, you're in twice as much trouble." It's true.

Any mechanic will tell you the most likely place for engine failure is at first power reduction. Lose the critical engine at Vmc or below at low altitude and unless you're sharp, the chances are excellent that you'll roll inverted and go in before you can solve your problems. That's why twin pilots have to practice their single-engine work.

And that's the reason for the existence of the 337. The blamed thing is safe! Lose an engine in a Skymaster and you proceed with what you were doing.

Particularly in a Riley-ized Skymaster. In common with virtually every other gen av twin, there were times when the manufacturers' standard birds were somewhat overdrawn at the performance bank, trying to climb out on one under heavy, high, and hot conditions.

In this airplane, that will never be a problem.

Conditions at McClellan-Palomar Airport (elevation 348 feet) were 25 degrees C and a 7-knot wind pretty much right down the single runway at take-off. With a full 150 gallons of fuel and three well-fed men aboard, we were within 50 pounds of the airplane's 4,700-pound licensed gross weight.

It had been a long time since I'd flown a Skymaster, and I didn't hurry the airplane off the runway because I wanted to accustom myself to the feel of the controls. Nevertheless, we were off the ground with 1/3 (take-off) flaps in 800 feet---and climbing at 2,500 fpm, exactly twice the rate of the factory airplane!

Part of the performance was due to the extra ponies front and rear, the rest to the effective Horton STOL remake of the wing leading edges.

I bent it around to the right and headed east toward Mt. Palomar, watching the temperatures and the climb rate. She dropped off to 1,500 fpm just shy of 10,000 MSL, but maintained that up to 17,500 feet---where we stopped to stay beneath the positive control floor in that vicinity. We were threading a narrow corridor between all kinds of restricted airspace in an attempt to give us maximum latitude for air work and minimum argument from ground controllers.

En route, I tried my usual series of left-right turns and rediscovered what I'd long since forgotten about Skymasters: Ailerons are heavy on the ground, but become quite light in the air. Con-

Riley holds the patent on an extremely effective intercooler design, and he puts it to good use on his recycled P-Skymasters

versely, the long, balanced elevator is exceedingly light on the ground but quite heavy in the air. This disharmony and changing control feel takes some getting used to.

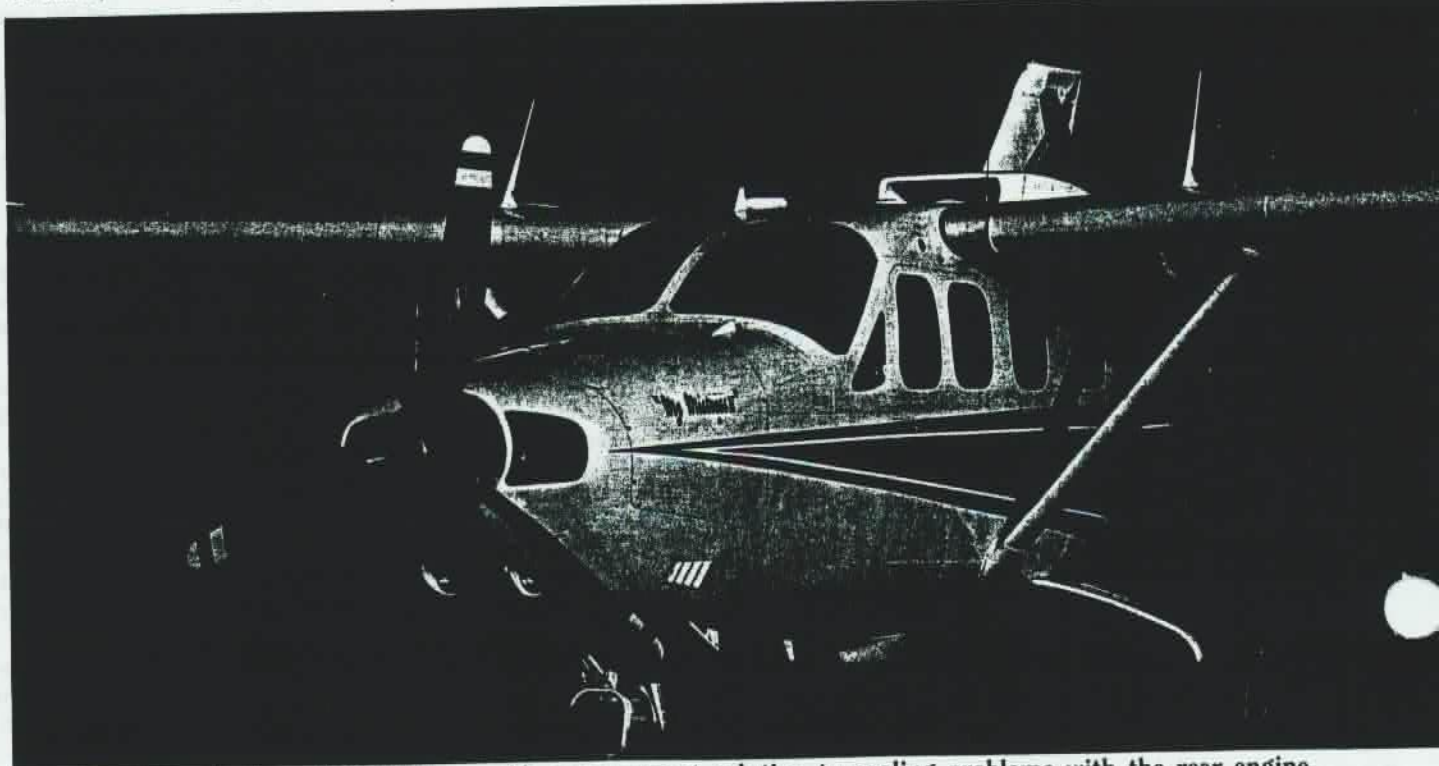
I leveled off at altitude and left the power at the max, trying for a speed run, but it wasn't to be. We couldn't get more than 235 mph true at our altitude. However, Danny Erickson, Riley vice president and project manager, told me later he saw 297 mph TAS at 23,000 feet one day; within 3 mph of Jack Riley's target maximum cruise. Fuel burn there was about 110 pph per engine, or 36.5 gph, total.

A good cruise figure is 31 x 2200, which produces 175 knots indicated or 200 true on 180 pph---30 gallons. At 23,000 feet, if you choose to go that high, you can loaf along at 240 KTAS--280 mph. Lose an engine, feather the prop---and you cut the cruise by roughly 40 knots, which brings you down close to where the factory P337 cruises with the original 225-hp Continental TSIO360-C's.

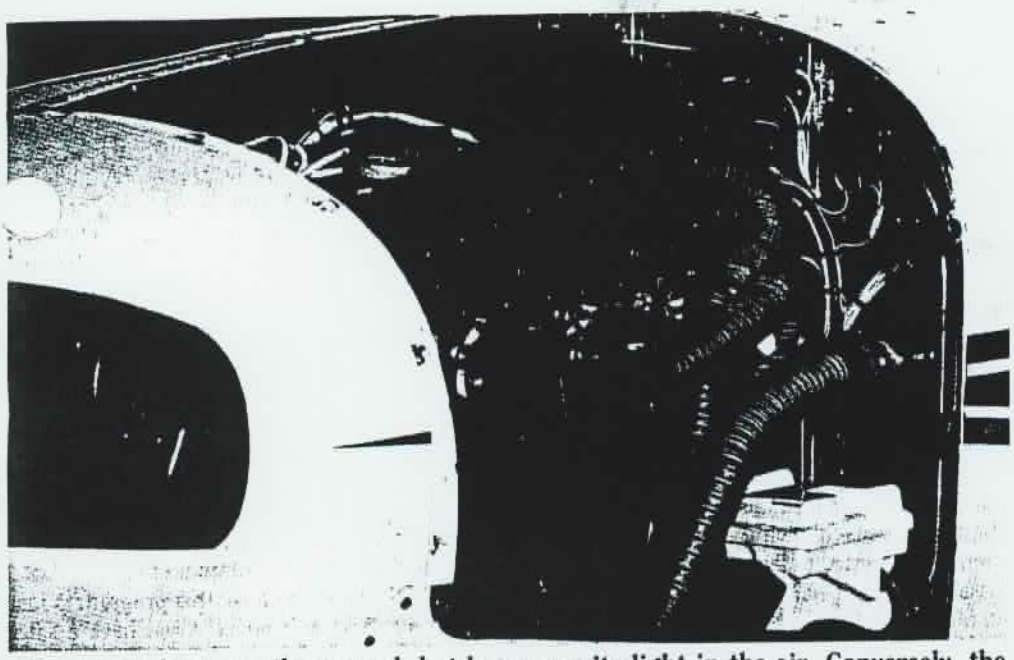
Any way you slice it, that's pretty rapid transportation.

Furthermore, you travel in comfort. The largely unchanged Cessna pressurization system provides a 3.2 ppsi differential and maintains an 11,500-foot ceiling to 25,000 feet. Soundproofing on the P337 always was good, and when it comes out of Riley's shop it's better. You can converse normally in the cabin without the use of headsets and a demand intercom--but to be frank, I like those anyway. Then you don't risk missing a transmission some harried controller--and you can listen to your favorite music the rest of the time.

In any case, if you want it a bit quieter, you can move the maximum point of cabin noise fore and aft by minor readjustment of cruise rpm on the 76-inch, three-blade, full-feathering Hartzells, an adaptation of the props used on the 58P Baron and the Aerostar



The big new turbocharged IO-520's provide a permanent solution to cooling problems with the rear engine.



Ailerons are heavy on the ground, but become quite light in the air. Conversely, the elevator is light on the ground but quite heavy in the air.

modified for maximum cruise. Curiously, Art Schadeberg, Riley chief mechanic and test pilot for Riley, said the props produce six knots faster cruise at 2,200 rpm than at 2,300.

Once you've sampled the speed and altitude capabilities of this airplane and verified that it's both comfortable and easy to fly, there's not much left to do except explore the stall mode.

We did that. I cleared the area with alternating left-right 360's at 60-degree bank (not much traffic at that altitude, but fun any-\, pulled the power off and got a clean stall at 78 KIAS at 17,500. gear and full flaps down and 20 inches of manifold pressure, the airspeed showed 40 KIAS; probably 64-65 knots true.

I held the airplane fully stalled through as many as six oscillations in varying configurations and found it totally controllable each time, though it porpoised through perhaps 20 degrees of pitch. I did mild turns left and right in a fully-stalled condition, and found no problem maintaining control. When stalled out of a 30-degree left bank and allowed to respond, the airplane rolled to level flight.

What more could you want? This thing's a very fast pussycat. No wonder Cessna owner surveys showed 80 percent would buy another Skymaster--the greatest customer loyalty in the product line.

Furthermore, Riley's "Super Skymaster" is even further improved. Use of yarn tufts in stall testing showed considerable turbulence over the wing roots and cabin because the Horton STOL modifications stopped seven inches short of the fuselage. Riley's crew built up the offending area to match the rest of the leading edge, and lowered the stall speed by three mph. Further testing showed that as a result, they could boost the gross weight to 5,400 pounds without increasing stall speed above 62 knots. They plan to do that, early in 1994.

The Skymaster is not a small airplane, but it's compact and well-balanced. The wing spans 38', it is 29' 9" long from front spinner to the tip of its twin tails, it stands 9'4" high and boasts 201 sq ft of wing area. Standard empty weight is 3,188 pounds, and gross weight wing loading is 23.2 pounds per square foot. Taking Jack Riley's figures of 342 delivered horsepower per engine at 20,000 feet, this version has a power-to-weight ratio of 6.88 pounds/horse-\r. The factory version was 10.4 pounds/hp, and that was no \h.

Four fuel tanks are buried in each wing, and the whole assembly gets added stiffness from the short, stout wing struts attaching to the bottom of the fuselage in classic Cessna style. These are sort of surprising on a go-fast twin, but they cost only two mph, provide great strength with light weight, and give a place to bury the flush pitot tube. Lateral and upward visibility, by the way, is quite good, though like many comparable airplanes the flaring instrument hood restricts the view of the runway on the ground.

We spent a few minutes playing with the sophisticated avionics suite that comes standard in Mr. Riley's Muscle Mixmaster, noting in passing that it's possible to preprogram and store 25 flight plans in the elaborate and highly accurate new Bendix/King KLN-90 GPS. This in turn is coupled to a programmable S-TEC System 65 autopilot with altitude pre-select and automatic capture, so you can fly an entire flight plan automatically except for take-off and landing and power/fuel management. Alternatively, you can retain a measure of control by shifting back into heading mode and simply moving the CDI heading bug to next waypoint each time one is reached.

The 337 electronics suite is well-integrated, accessible, and easy to use. It's just what the doctor ordered, right down to the thumb-controlled electric trim (always standard with autopilot). The one thing N52DG didn't have (yet) was speed brakes, an improvement that's well worth having for the precise control it confers over descent rate. Personally, I've always felt people who fly single-pilot IFR on an occasional basis to varying destinations need all the equipment back-up they can get. In contrast, scheduled air carrier crews fly with pilot and copilot and al-

ways to the same destinations. They get to where they can do it with a wet compass and a wristwatch, sipping coffee and with one foot propped on the power pedestal.

Maximum permissible landing weight with full 25-degree (3--notch) flaps is 4,465 pounds, and now that we were down to that it was time to go shoot some.

The Skymaster shares the 140-knot gear speed of the 210, but the now standard spoilers (not speed brakes) ought to make that easy to attain any time. Once the gear is down and locked and the doors tucked up you can fly it at 200 KIAS. Flaps, too, are limited to 110 knots. Remember, however, that this airplane sold off the shelf to the USAF for military use. It's no trick at all to come scorching down the sky at somewhere on the high side of 230 knots, do a 360 overhead, pull off the power, load up the wing, throw out the gear, throw out the flaps, run up the prop pitch, hit the trim button and roll out on final at a comfortable 90 knots. This tactical approach actually helps, because the airplane isn't easy to slow down.

Unfortunately, this was coastal California, 52DG was a strange airplane to me, and I wasn't that good. Furthermore, I was following some wandering Mooney who wasn't sure whether he wanted to land or just fool around in the traffic pattern. Carlsbad airport is hard for a visitor to see, cleverly concealed as it is in a landscape composed of muted olive, gray, and brown tones. Between looking for traffic and looking for the single runway in the California haze, I was in a little higher and tighter than I would have liked.

I still nailed the 90-knot approach speed well enough (blue line is 81), but overcontrolled a tad on that blasted heavy elevator in the flare, getting a gentle skip and solid thunk on the mains. Embarrassing! I therefore turned off, taxied back, and did it over; this time trying a little harder all the way around the patch and restoring most of my self-esteem. This is an airplane that, with flaps, can take-off in 500 feet and land in the same distance--provided you want to get heavy on the brakes.

In the process, I proved the truth of Jack Riley's theme, that "This is an airplane the average private pilot can fly--safely!" This is a twin that touches down at 60-65 knots. Not only that, he can fly it right up there with the high rollers. Riley says this thing will fly with a Conquest I on 35 gallons and outrun a Cheyenne II by 25 knots. I believe him.

Speed is not cheap, of course. There are some 300 changes involved in this complicated conversion, and the paperwork on the STC still wasn't quite completed as this was written. Therefore, Riley International's introductory price on this latest winged wonderwagon is $525,000, which sounds like a real fortune for a recycled 20-year-old Cessna. But Jack Riley has an answer for that, too. Did you doubt it? Listen closely, now:

Riley International capitalizes all the improvements on your 1973 P-337 separately--the big engines, the special props, the sophisticated avionics fit, the Horton STOL kit, the $110,000 PowerPak spoilers---totaling $150,000. You depreciate these improvements by half your taxes. By the time you're through you've laid off $137,500 of the total cost on Uncle Sam. And with charge-off of the complete overhaul, "that brings the net cost of the airplane down to $375,000-and a Mooney costs 326,000!" Riley says triumphantly.

But he's still not through. First, because this program is just launching, Riley says at this time any buyer could have a sales agency as a distributor, which enables him to charge off everything. He says there is no distributor liability. It is, after all, a Cessna--and Riley International is the modifier. Distributors don't pay sales tax, they get a resale permit. "Sales tax on a Mooney is $27,000." Furthermore, he agrees to buy back the airplane at customer's net. "If you win you win and if you lose I'll give you 100% of your net dollars back. The only cost you ever have is fuel, maintenance, and insurance, because the airplane is not depreciating."

Heck, how can anybody afford NOT to have one?

FMI: Riley Int'l, 2206 Palomar Airport Rd, Carlsbad, CA 92008; (619) 438-9089. ✈